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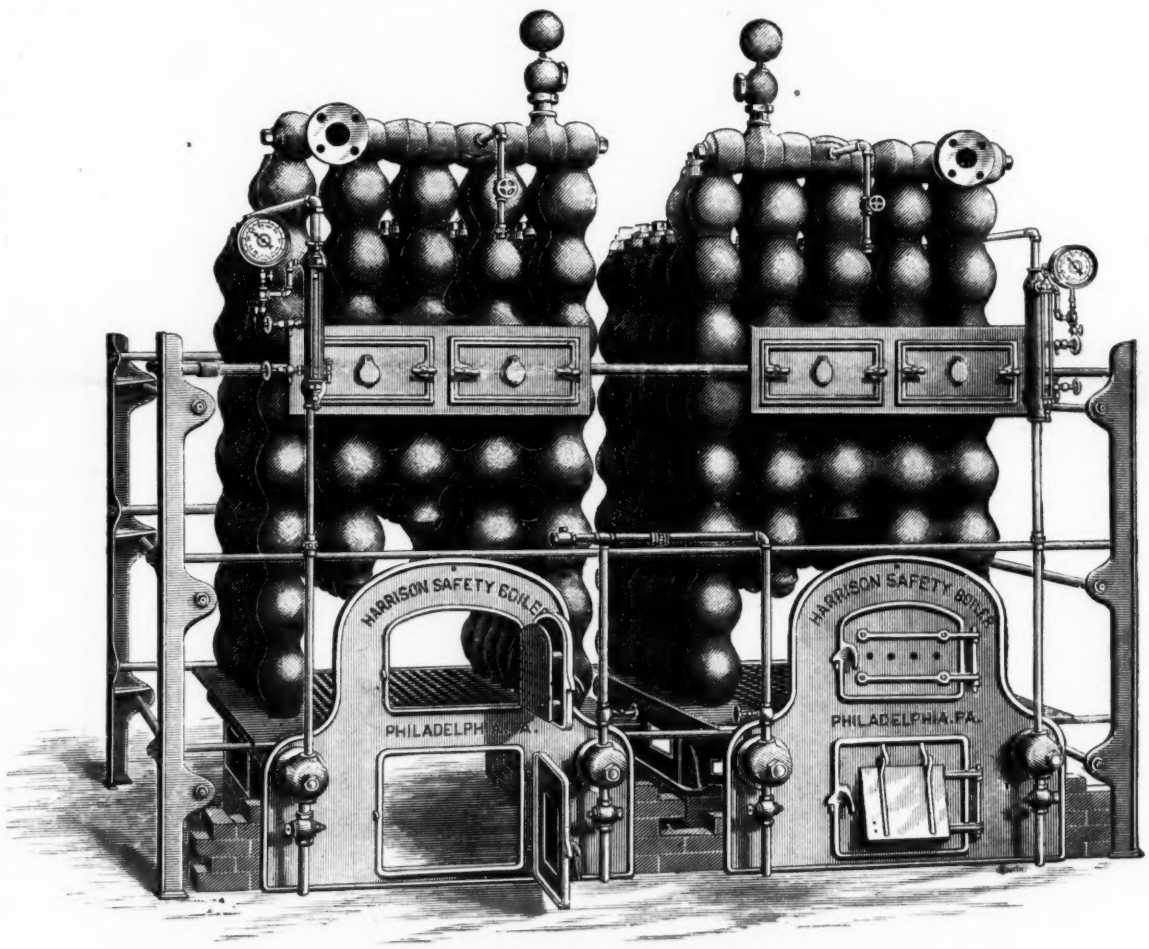
Vertical Form of Harrison Safety Boiler.

The engraving shows a form of setting for this well-known type of boiler, recently devised for use in special locations, where the usual setting was inadmissible, from lack of space. A number of boilers have been set in this way within the past year, giving satisfactory results, for both power and steam heating purposes. The cut shows two boilers of twenty horse-power each, set together, and in use at the Presbyterian Orphanage buildings in West Philadelphia.

This type of boiler is constructed of a number of spheres eight inches in diameter having rebate, milled joints, of the same construction as the sections, or "units," used in the standard boilers of this type, but as shown in illustration, the sections are placed in a vertical position directly over the grate and extend down on each side of the furnace, terminating in mud drums beneath; the sections and drums are held together by $1\frac{1}{4}''$ bolts passing through the interior of the sections, having a tee head on the lower end which locks in a "pocket" in the drums, and a close-end steel hexagon nut on the upper end.

The ends of the drums extend through the front, hence are always accessible for cleaning, for which purpose the caps covering the ends are readily removed. The drums rest in suitable chairs which support the entire boiler, independent of the brick work.

Deflector tile are placed just below the water line in such a manner as to cause the heated gases to circulate thoroughly among the sections before passing off to the flue at the rear; suitable cleaning doors are provided through which the exterior surface of all the sections is cleaned by the use of the steam jet.



VERTICAL FORM OF HARRISON BOILER.

The Harrison Safety Boiler Works, Germantown Junction, Philadelphia, are the manufacturers.

The Constitution Club of this city, which is located at 84 Madison avenue, is having a series of addresses and discussions at its Wednesday evening meetings. The subjects are practical and of public interest. Those yet to come are: "Organized Labor in Politics," by Robert Blissert, Nov. 5; "Restricting Immigration," by W. Chamberlain, Nov. 10; "Independent Voters," by Edwin M. Wight, Nov. 17; "Party Organization and Practical Politics," by R. W. Bowker, Dec. 8; "Laws which are Oppressive to the Working Classes," by Louis F. Post, Dec. 15; "The Legislature and the Cities," by John V. B. Lewis, Dec. 22. It is a good time to discuss live political topics when no election is near. When a lot of candidates are before the public, the politicians usually succeed in throwing a haze around principles and making heroes of the men seeking office.

John Chipman Hoadley.

J. C. Hoadley died of gastritis at his home in Boston on the twenty-first day of October; and thus passed away a man eminent as an engineer, skilled in principles and successful in their application; of staunch integrity, with a versatile mind not limited to technical subjects, but embracing a wide knowledge of literature, adding by a wide and general culture to his charms of character.

Mr. Hoadley was born at Turin, N. Y., in 1818, and entered the service of the engineers on the Erie Canal in 1836. In 1844 he left the State Engineer corps and became engineer for the several corporations manufacturing carpets, ginghams and wire cloth at Clinton, Mass.

In this position he built dams and installed motive power, constructed and equipped mills, invented machines for special uses, and was concerned in all matters connected with starting of an industrial village.

It was in this place that he gave free evening lessons in mathematics and drawing to those of the men who chose to avail themselves of the opportunity, and this instruction developed the mind and gave skill to the hands of some of these pupils who were thus enabled to rise to positions of responsibility.

In 1852 he was appointed agent of the Lawrence machine shop, and later opened an establishment of his own in the manufacture of the widely known Hoadley portable engine. This proved to be a very profitable business, and Mr. Hoadley became quite wealthy, but a sudden succession of reverses took his property from him, and in 1877, bereft of all his possessions save his library, he resumed his profession as an engineer at the age of 59, and for a number of years had a large practice, particularly as an expert in patent causes, where his keen analysis in dissecting the old from the new, and the invention from the infringement in any device, made his services of great value.

Mr. Hoadley was indeed a self-made man. From early years an orphan boy obliged to support a widowed mother and others of the family, he obtained a thorough knowledge of practical matters in engineering work, while his evenings were passed in studies which enabled him to master French, German, Latin and Greek, a thorough knowledge of the higher mathematics, and a wide range of literary culture treasured up in a retentive memory and apparently always at command.

Above his intellectual attainments, his strength of character stood pre-eminent. Cruelly defrauded in his last days by those presumed to possess fidelity to trust, he at all times maintained a serene disposition; not puffed up by opulence nor abashed by misfortune.

His public trusts were few, but of great responsibility. He was a presidential elector in 1872, a member of the Massachusetts Board of Health for many years; a member of the Massachusetts Legislature, and also filled several municipal offices in the city of Lawrence.

He was a member of the Trustees of the Institute of Technology, and one of the charter members of the American Society of Mechanical Engineers, being one of the original officers, and a frequent and able contributor to its transactions.

In 1862 the Governor of Massachusetts gave him a captain's commission and sent him to Europe to examine coast fortifications and report a plan for the defense of the Massachusetts shore.

For a monument to Mr. Hoadley there is no great structure of imposing lines, colossal measures, and an endurance equal to all time, but in the busy mill towns of New England his skill is shown in mills wisely designed and strongly built. Enough of the record of his professional life is shown in the transactions of engineering and scientific societies and the records of the United States Courts to show the extent and accuracy of his learning.

The lesson of Mr. Hoadley's life shows what results are attainable under American institutions to any youth of robust health and fair mental parts, by this example, wherein one without wealth, influence or education rose to the possession of all these to an eminent degree, merely by the exercise of probity, industry and application.

C. J. H. W.

In discussing the first Minneapolis Industrial Exhibition, which closed Oct. 4, *Wood and Iron* says:

"The visitors must feel that it has paid them, if the fact that there were 340,000 paid admissions, or over 9,400 per day, is any criterion. If education, familiarity with the newest and best products of the world's manufactures, and social intercourse with those actually engaged in improving the condition of humanity is any benefit, then they have been amply paid.

"Whether it has paid the stockholders or not, interests not only them, but the public at large. The fact that they can pay all expenses and declare a dividend of 8 per cent. the first year, besides having property worth 50 per cent. more than it cost, is far more eloquent than anything that we can say.

"But has it paid exhibitors? We made a tour of the building on the last day and propounded this conundrum right and left. The universal opinion is that it has paid. Some expressed themselves in terms so extravagant that to reproduce them here would be considered as fulsomeness. Some have found that the direct sales made during the exposition have paid handsomely; some that the sales have paid the expenses and the advertisement has been clear gain, while others, who do not claim to have made many sales, say that this advertisement is the best possible one that could have been made for the money."

Jay Gould recently visited Kansas City and made a proposition to some real estate men to concentrate the shops of the Missouri Pacific Railroad in that city.

Practical Drawing.

By J. G. A. Meyer.

Fourth Paper.

47. The simplest form of plane figures is a portion of a plane bounded by three straight lines and is called the triangle, and the three straight lines are called its sides. There are several kinds of triangles. We may classify them with reference to their sides, or we may classify them with reference to their angles. When classified with reference to their sides there are two classes.

48. 1st. Scalene triangles, Fig. 18, which have no two sides equal.

49. 2d. Isosceles triangles, Fig. 19, which have two sides equal.

50. The isosceles triangle has a particular case called the equilateral triangle, Fig. 20, all of whose sides are equal.

When triangles are classified with reference to their angles, there are two classes.

51. 1st. Right-angled triangles. A right angled triangle is one which has a right-angle, as $A\ B\ C$, Fig. 21, which is right-angled at B. The side $A\ C$, opposite to the right angle, is called the hypothenuse.

52. 2d. Oblique-angled triangles. An oblique-angled triangle is one, all of whose angles are oblique, as shown in Fig. 22.

This latter class of triangles is subdivided into acute-angled triangles and obtuse-angled triangles.

53. An acute-angled triangle is one which has three acute angles, see Fig. 22.

54. An obtuse-angled triangle, Fig. 23, is one which has an obtuse angle.

55. The base of a triangle is the side upon which it is supposed to stand. Any side may be assumed as the base, but in an isosceles triangle, that side is called the base which is not equal to either of the others. When any side, as $A\ B$ of a triangle, Fig. 24, has been adopted as the base, the angle $A\ C\ B$ opposite to it is called the vertical angle.

56. The altitude of a triangle is the perpendicular distance from the vertex of the vertical angle to the base.

Let $A\ B\ C$, Fig. 25, represent an acute-angled triangle, and $A\ B$ its base, then the altitude of this triangle will be $C\ D$, that is, the perpendicular distance from the base $A\ B$ to the vertex C of the vertical angle.

Again, let $A\ B\ C$, Fig. 26, represent an obtuse-angled triangle, and $A\ B$ its base, then the altitude will be $C\ D$, that is the perpendicular distance between the base $A\ B$ produced and the vertex C of the vertical angle.

57. The vertex of the angle from which the altitude is measured is called the vertex of the triangle.

The next simplest class of plane figures comprises all those which are bounded by four straight lines, and are called quadrilaterals.

58. Quadrilaterals are divided into three classes, depending upon the relative direction of the sides. For the commencement of our study it is only necessary to name and define one of the three classes, namely, the parallelogram.

59. A parallelogram is a quadrilateral which has its opposite sides parallel two and two, as Fig. 27, in which the side $A\ B$ is parallel to $C\ D$, and $A\ C$ parallel to $B\ D$.

There are two varieties of parallelograms.

60. 1st. Rectangles. A rectangle, Fig. 27, is a parallelogram whose angles are all right angles.

61. If all the sides of a rectangle are of equal length it is called a square, as shown in Fig. 28. Hence a square is an equilateral rectangle.

62. 2d. Rhomboids. A rhomboid is a parallelogram whose angles are all oblique, and its adjacent sides are not necessarily equal, Fig. 29.

63. But if all the sides are equal it is called a rhombus, Fig. 30. Hence a rhombus is an equilateral rhomboid.

64. The base of a plane figure is any one of its sides on which the figure is supposed to stand.

65. The altitude of a parallelogram is the perpendicular drawn to the base from the opposite side. Thus $E\ F$ is the altitude of the parallelogram $A\ B\ C\ D$, Fig. 31.

66. The diagonal of a parallelogram is a straight line joining the vertices of two angles of a parallelogram which are not adjacent. Thus $B\ D$ is the diagonal of the parallelogram $A\ B\ C\ D$ in Fig. 32.

67. In practical drawing we often name some of the straight lines "horizontal lines," and others "vertical lines."

A line is said to be horizontal when it is parallel to the surface of still water, providing we consider the surface of the water to be so small that its curvature may be neglected.

68. A line is said to be vertical when it is parallel to the direction assumed by the plumb line. In what follows, vertical lines will be considered to be parallel because the distance between them is comparatively small, and the lines short. But when the distance between the vertical lines is very great and the lines long they cannot be assumed to be parallel, because all vertical lines converge towards the center of the earth.

69. We have now classified and named the simplest kinds of lines and plane surfaces, which will enable us to commence understandingly our study of practical drawing.

But we will first make a few remarks, which we hope the student will not consider out of place. We have frequently met persons anxious to learn practical drawing, but when to these the study of geometry is recommended, they hesitate to devote any time to it, as such a study seems to them to be of no practical value. If any of our readers have such impression of geometry, let them examine the names and definitions of lines and planes which we have already stated, and which we have copied from elementary geometry; they will then find that most of the terms given are frequently used in ordinary practice; for instance, the straight line, parallel lines, perpendicular lines, triangles, squares, circles, circumference of circle, are all familiar names in every-day practice; and the meaning of these names in practice is exactly the same as in geometry. Some of the names given to particular forms of triangles or parallelograms, we know, are not so familiar in practice; but it would have been better if they had been, because with the aid of these names, practical men can convey their idea of simple form without the aid of drawing, with greater ease and fewer words. And as we progress, the student will find that, not only are the definitions of lines and surfaces in geometry applicable to ordinary practice, but the constructions of geometrical problems are equally applicable to practical drawing.

We do not offer these remarks as an excuse for introducing geometry; we simply wish to point out the necessity of a knowledge of geometry to enable us to make satisfactory progress in practical drawing, because, as we have already stated, the science of geometry is the basis of all practical drawing; and we may here add that geometry also points out to us a regular course of study to follow, so that the different stages of our progress will be connected, and thus gain a clear conception of our subject. We therefore insist that the foregoing definitions, as well as those that follow, in addition to the problems which we will explain, must not be passed over lightly, but must be thoroughly studied, and committed to memory.

70. Assuming, then, that the student has followed our request and carefully studied the definitions, he will readily understand that, since we cannot draw a geometrical straight line (for this has no thickness), we can represent it by a physical straight line (Art. 22); but the definition given for the former must be strictly observed in drawing the latter; that is, our physical straight line must be drawn straight; crooks in it are not admissible. Again, if we have to represent an object whose outline is composed of straight lines, perpendicular to each other, our lines representing this outline must be drawn perpendicular to each other, and not only nearly so, but accurately so, according to the definition of perpendicular lines in geometry. Similar remarks are applicable to the circumference of a circle, angles or other figures. To draw these lines quickly and always with precision, we must call to our aid certain tools, generally named mathematical instruments or drawing tools. From the foregoing remarks, we may also conclude that, to show the true form of an object, free-hand drawing is of no use, and should only be resorted to when simply a sketch is to be made. The student needs but few tools for a commencement, and such, as well as the drawing material, we shall now explain.

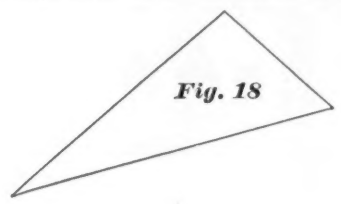


Fig. 18

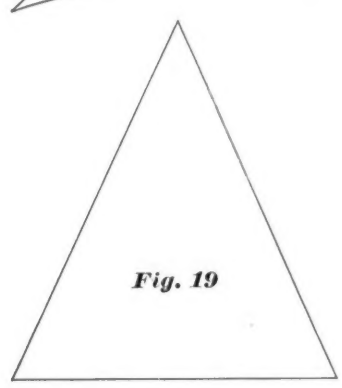


Fig. 19

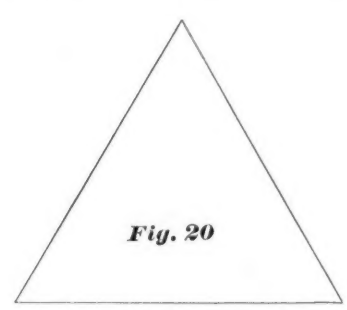


Fig. 20

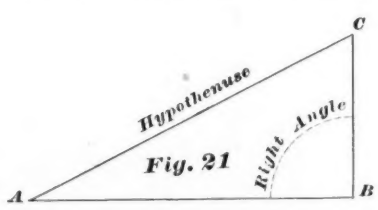


Fig. 21

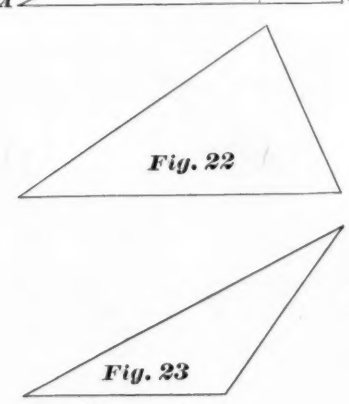


Fig. 22

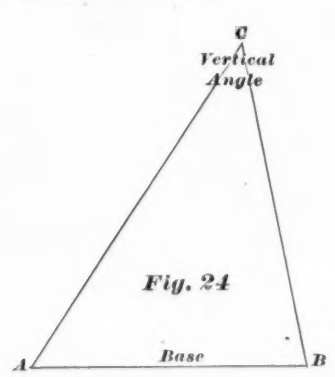


Fig. 23

Fig. 24

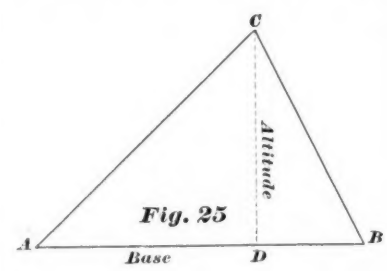


Fig. 25

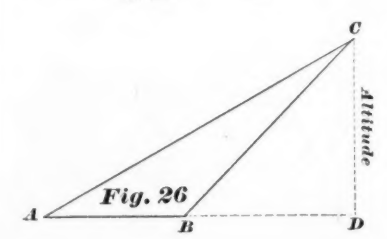


Fig. 26

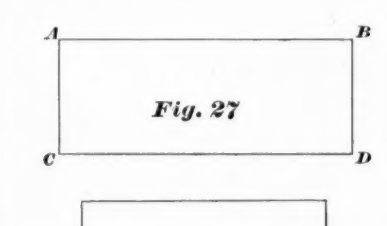


Fig. 27

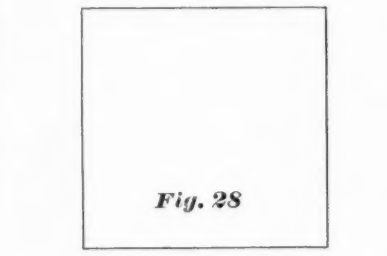


Fig. 28

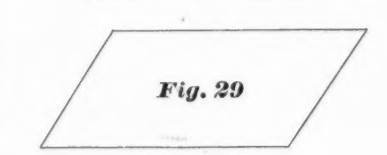


Fig. 29

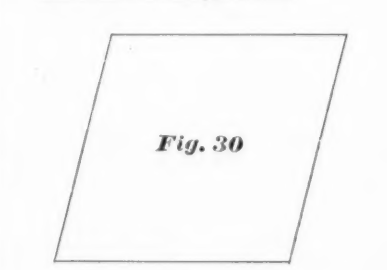


Fig. 30

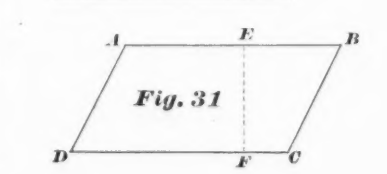


Fig. 31

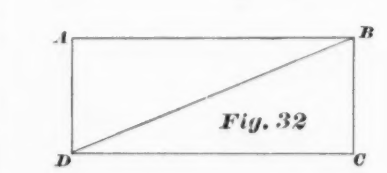


Fig. 32

Where American Exports Can be Increased.

The lethargy with which British manufacturers view improvements in the kind of goods wanted by foreign customers has been widely discussed in the British industrial press. They appear to be averse to any radical changes, and thereby give American manufacturers a good chance to compete with them. There is no doubt that our manufacturers could secure a much larger trade in tools and machinery in British colonies if they made the necessary efforts. One of the oldest and most prominent machinery works owners in Australia, who called at our office a few weeks ago, after visiting a number of machine shops in this country, said that he had been losing considerable money every year by not having the improved machinery and tools he saw in operation. In a recent issue the London *Ironmonger* says:

On all sides there are the same complaints of the immobility of our manufacturers and of the great care with which our foreign rivals study and supply the wants of the different countries of the world. It is not that we cannot supply the requirements of other markets, but very largely because we are content either to depend upon middlemen, or because we—that is to say, British manufacturers—either do not take pains to learn exactly what is required by the consumers, or will not supply exactly what they want. Even in our own colonies—peopled as they are to a very great extent by Britons and their descendants—we have lost ground, and are now compelled to fight for business which we ought never to have lost. We have fresh evidence of this in the shape of the letter we extract from *The Australasian Ironmonger*,

which has been addressed to that paper by Mr. George S. Lee. That gentleman is a practical man, and may be presumed to know whereof he writes. He is on the spot, and has made most minute inquiries throughout Australasia, having done which he says the only conclusion he can come to is that before long America and Germany will do the trade to a much greater extent than at present, unless our English manufacturers at once wake up to the requirements of the Colonies. All this we have said more than once, but we have been criticised for our attempts to bring the truth home to those concerned. It may be that Mr. Lee's statements will have weight with some of our manufacturers, and that those who make the goods specified in his list will promptly take measures to put themselves and their products properly and steadily before colonial buyers.

It seems that it does not do much good to point out advanced requirements of foreign customers, as the British manufacturers are impatient of criticism. Here is the opportunity of American manufacturers who are ready to adapt their product to the wants of consumers.

The Locomotive Engineers' Convention.

The 23rd International Convention of the Brotherhood of Locomotive Engineers before adjourning last week re-elected its officers of the past term as follows: Grand Chief Engineer, P. M. Arthur, of Cleveland; Second Grand Chief Engineer, J. K. Spragge, of Toronto, Ont.; First Grand Assistant Engineer, Harry C. Hays, of Cleveland; and Second Grand Assistant Engineer, A. R. Cavner, of San Francisco.

The term of the Grand Chief is three years; of the others one year. The organization of the Brotherhood was first undertaken in the city of Marshall, Mich., April, 1863, by the engineers on the Michigan Central R. R. A meeting was held composed of these engineers, and the result of their deliberations was a call for a convention of engineers, to meet in the city of Detroit, on the fifth of the ensuing month, May. At this convention delegates from only a few railroads were present, and with but little formality in their organization these delegates entered upon their duties.

A Constitution and By-Laws embodying the fundamental principles of the present organization was adopted, and on the eighth of May, 1863, a band of twelve engineers, the delegates included, joined hands and pledged themselves to support the Constitution and By-Laws then adopted, and to resist the wrong and maintain the right. Officers were elected, and Division No. 1, of Detroit, "Brotherhood of the Footboard," stood forth as the pioneer in the work of the regeneration and elevation of the locomotive engineers on this continent. The organization of divisions soon began, and in three months ten divisions had sprung into existence, and at present the brotherhood is composed of 323 divisions, with twenty thousand members, and covers every railroad, and every State and Territory in the United States, as well as a large part of the British Provinces and Mexico. This great success of the brotherhood is ascribed to their wisdom in electing wise leaders, and submitting differences between members and their employers to arbitration.

As the delegates and their families have taken their way homewards, we have no doubt that they take with them pleasant recollections of their visit in New York City. We are informed by some of the delegates that they have never been shown greater hospitality and received more attention to their comforts, than that extended to them by the citizens of New York, and they have had a most enjoyable time. The excursion through Long Island Sound, grand excursion to Newburgh up the Hudson, excursion over the elevated roads, sight seeing in carriages, and the attendance at the unveiling of the colossal Statue of Liberty in New York harbor, and many other amusements, will be things long to be remembered by the members and their families. The expenses for these entertainments were defrayed by the locomotive engineers of New York, and by handsome checks sent by parties unknown. The courtesies of the railroads and transportation lines were freely extended to them.

The United States Geological Survey is about to issue a volume entitled Vol. III. of "Mineral Resources." It will contain the statistics of the production of metals in this country for the year 1885. Following is from advance sheets:

Iron.—The principal statistics for 1885 were: Domestic iron ore consumed, 7,600,000 gross tons; value at mine, $19,000,000. Imported iron ore consumed, 390,786 gross tons; total iron ore consumed, 7,990,786 tons. Pig iron made, 4,044,526 gross tons—a decrease of 53,342 tons as compared with 1884; value at furnace, $64,712,400, or $9,049,224 less than in 1884. Total spot value of all iron and steel in the first stage of manufacture, excluding all duplications, $93,000,000—a decline of $14,000,000 from 1884.

Aluminum.—The production of metallic aluminum increased from 1,800 troy ounces in 1884 to 3,400 ounces in 1885, valued at $2,550. Aluminum bronze, containing 10 per cent. aluminum, was made to the amount of about 4,500 pounds, valued at $1,800.

"Do you give premiums with your publication? If so, would you like to consider the subject of giving hammocks?"

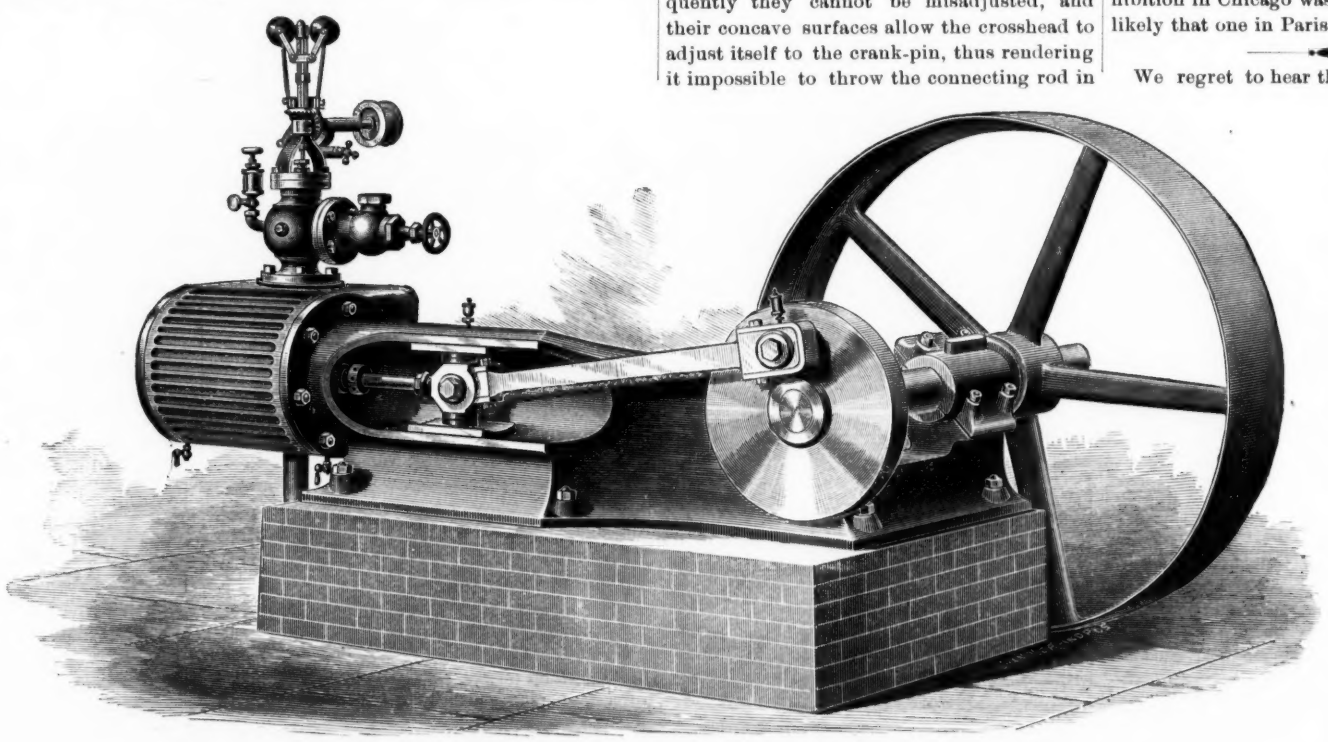
Thus writes a hammock manufacturer to us. We answer in a general way, which is also specific for any such case. We do not sell anything, but the AMERICAN MACHINIST newspaper and space in its advertising columns (not reading columns.) We do not favor the policy of giving away any kind of merchandise as a regular business, and do not believe any sane man actually does so. Some publishers may make a practice of selling a hammock and a subscription to their paper in one lot, but they are careful to get value for both. If they did not the business must eventually go to the wall. We much prefer putting the whole value into the newspaper itself and letting those who want hammocks and other merchandise go to the regular dealers in and manufacturers of the articles wanted.

"The Proffessor in the Machine Shop" is the large gilt inscription on the cover of a small volume of 122 pages before us. The book treats of shop matters in an off-hand, humorous way. In the preface it is mentioned that the incidents narrated are not fictitious, although the correct names are not used, "for many of the individuals to whom they belong might object to publicity." The spicy way of treating matters makes the contents readable. The book is marked "Part 1," from which we infer that other parts are to follow. Although the Professor does not give his name, a portrait facing the preface shows him to be Egbert P. Watson, who publishes the book at 150 Nassau street, New York. We are not informed as to the price.

Self-Contained Steam Engine.

The engraving represents a self-contained steam engine made by Chandler & Taylor, Indianapolis, Ind. One of its distinguishing features is the bed, in which the metal is so distributed as to present the greatest resistance in the line of motion between the cylinder and crank-shaft, and furnishing within itself both of the bearings for the crank-shaft—an arrangement which will bring the crank-shaft square with the other working parts of the engine. The guides, which are also a part of the bed, and of the same general form as are used on Corliss engines, are of large area and of cylindrical form, and, being a part of the bed, are not adjustable; consequently they cannot be misadjusted, and their concave surfaces allow the crosshead to adjust itself to the crank-pin, thus rendering it impossible to throw the connecting rod in any tampering with the valve adjustment, which is permanently fixed to cut-off at five-eighths stroke. The crank shaft, which is of hammered iron, is of large diameter, being about one-half the diameter of the cylinder, and runs on wide babbitted bearings, the crank bearing being two, and the outboard bearing two and one-half diameters of the crank shaft, which give it support in a manner best calculated to resist the deflecting tendency caused by the overhang of the crank. This overhang is reduced to a minimum by extending the crank bearing into the crank wheel, and by making the connecting rod flat, so that it will run close to the face of the crank wheel. This will be better understood by a description of the crank wheel and pin. The large steel crank pin, whose diameter and breadth are about equal, is ground to size, by special machine, after being hardened. It is made without collars and allows the brass boxes of the connecting rod to face against the crank wheel.

The crank wheel is cast with a counterbalancing weight within itself, and has a short hub on the back side, which meets the extended crank-bearing under the rim and counterweight; this short hub is reinforced on the front side, to maintain the necessary length for keying to the shaft on which it is pressed. This engine, while not specially placed in the market as a high speed engine, is nevertheless designed for quick motion, and may be run at almost any desired speed.



NEW SELF-CONTAINED STEAM ENGINE.

The crosshead is made of steel and has gibs filled with babbitt metal. These gibs are in length about equal to the diameter of the cylinder, and their breadth is about one-half of their length, thus obtaining an ample wearing surface. The flanged end of the bed is faced and turned to fit the counterbore of the cylinder, and takes the place of a cover or head, and also forms a rigid support for the cylinder that is attached to it. The crank-pin, piston rod, valve rod, and some of the other minor parts, are made of steel.

The piston is of the simplest form, being a plain disk turned to fit the bore of the cylinder and having two recesses in its surface into which rings of eccentric shape are sprung to form a joint between the piston and cylinder surfaces. The steam ports are at the side, and are as low as the bore of the cylinder, which provides for complete drainage. The eccentric, instead of being fastened with a set screw, has two key-seats, one for the over stroke and the other for the under stroke, and has an interchangeable key, which secures it in either position, and completely frustrates

It is proposed to hold an International Exposition of Railway Appliances in Paris next year, together with an international congress of railways for the discussion of important questions. As the Railway Appliances Exhibition in Chicago was quite successful it is likely that one in Paris would also do well.

We regret to hear that the Case School of Applied Science in Cleveland, Ohio, which was endowed by the late Leonard Case with $2,250,000 worth of property, has been destroyed by fire. The loss of the structure is $200,000.

The New York, Providence & Boston Railroad Company evidently believes in co-operation. A new bridge over this road, at Auburn, is soon to be built. It will be fifty feet in width, and have sidewalks on each side. The cost is to be from $13,000 to $14,000, of which the residents in the village have agreed to pay $2,000, the town $4,000, and the balance is to be paid by the railroad company.

A large factory of Breslau required a chimney 54 feet in height. Instead of constructing the chimney with bricks, as usual, a large number of solid blocks of paper, firmly compressed, were made use of. These blocks were placed carefully one on the top of the other, and joined together with a special cement.

The Singer Manufacturing Co., of Elizabeth N. J., according to a Cornwall paper, has property near the city limits of Newburgh, N. Y., and will remove their extensive sewing machine works to that place. The company has contemplated a removal for several years, owing to the heavy taxes in Elizabeth, brought on by municipal extravagance. Newburgh will gain largely by this removal, and Elizabeth will correspondingly lose. This case shows what we have often urged in these columns, that manufacturers should take an active interest in the government of the city where their works are situated.

New Light Bench Drill.

The machine herewith illustrated is one lately brought out by E. E. Garvin & Co., 139–143 Centre street, New York.

This style is designed to be fastened to the edge of a bench or table as shown in cut. There is another style of the same drill, made to be fastened to the wall or a post. The spindle is driven by 1¼″ belt direct from the countershaft. These tools are especially adapted for drilling small work, up to $\frac{5}{16}$″ hole, in large quantities, as required in light manufacturing, and permit of grouping a number in very small space, in which case they are driven from one long shaft with friction clutch pulleys. The table is provided with a fixed wrench for adjustment. There is an adjustable stop on the upper end of the spindle to regulate the depth of hole. The countershaft accompanies the drill.

It weighs, when complete and boxed, about 150 pounds.

List of Subjects.

WITH THE COMMITTEES APPOINTED TO REPORT THEREON AT THE ANNUAL CONVENTION OF THE MASTER CAR-BUILDERS' ASSOCIATION, TO BE HELD IN MINNEAPOLIS, JUNE 14TH, 1887.

1. *Standards and Appliances for the Safety of Trainmen:*

In 1884, the committee on this subject was appointed in accordance with the following resolution: "*Resolved*, That a committee be appointed to prepare a circular calling the attention of railroad managers to the standards and the appliances for the safety of trainmen, which have been recommended by this association, and that this committee be urged to do everything in its power to secure their adoption." At the convention held in 1885, the committee was discharged, and a resolution was passed to have a new one appointed. This committee was continued in 1886.

H. Hegewisch, United States Rolling-Stock Company, No. 35 Wall street, New York.

John Kirby, Lake Shore & Michigan Southern, Cleveland, O.

M. N. Forney, No. 23 Murray street, New York.

2. *British and Continental Practice in Matters of Interest to the Master Car-Builders' Association:*

R. H. Soule, Lake Erie & Western, Buffalo, N. Y.

Wm. McWood, Grand Trunk, Montreal, Can.

Henry A. Whitney, Intercolonial, Moncton, N. B.

3. *Automatic Freight Car Brakes:*

Godfrey W. Rhodes, Chicago, Burlington & Quincy, Aurora, Ill.

Geo. Hackney, Atchison, Topeka & Santa Fé, Topeka, Kan.

B. Welch, Central Pacific, Sacramento, Cal.

John S. Lentz, Pennsylvania & New York Canal & Railroad Company, Packerton, Pa.

W. T. Hildrup, Harrisburg Car Co., Harrisburg, Pa.

4. *The Comparative Advantages of the Two Methods of Constructing Freight-Cars, with and without Platform Timbers or End Sills projecting from the End of the Car:*

This committee was continued, its scope enlarged, and it was empowered to submit plans giving two standards for the end floor-framing of freight-cars.

E. B. Wall, Pittsburgh, Cincinnati & St. Louis, Columbus, Ohio.

B. K. Verbryck, Chicago, Rock Island & Pacific, Chicago, Ill.

Geo. W. Cushing, Northern Pacific, St. Paul, Minn.

W. H. Harrison, Baltimore & Ohio, Baltimore, Md.

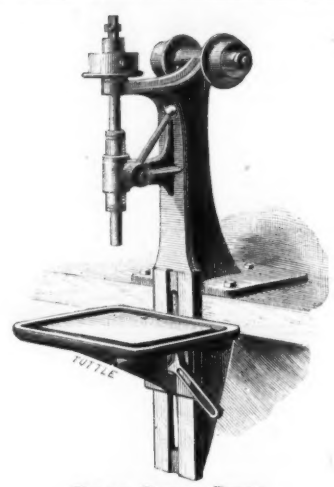
W. F. Turreff, Cleveland, Col., Cinn. & Ind., Cleveland, O.

5. *Maximum Outside Dimensions of Freight Cars:*

John P. Levan, Pennsylvania Railroad, Altoona, Pa.

C. A. Smith, Union Trunk Line, 267 Fourth street, Jersey City, N. J.

Geo. C. Watrous, Detroit, Lansing & Northern Railroad, Ionia, Mich.



SMALL BENCH DRILL.

6. *Standard Draw-Gear for Non-Automatic Couplers:*

S. B. Haupt, Norfolk & Western Railroad, Roanoke, Va.

J. N. Mileham, New York, Lake Erie & Western Railroad, 234 Third street, Jersey City, N. J.

Allen Cooke, Chicago & Eastern Illinois Railroad, Danville, Ill.

Appliances to Prevent the Slipping of Wheels, both Passenger and Freight:

J. W. Marden, Fitchburg Railroad, Boston, Mass.

F. M. Wallis, Philadelphia, Wilmington & Baltimore, Philadelphia, Pa.

W. H. Day, Wilmington, Columbus & Augusta Railroad, Florence, S. C.

8. *Standard Freight Car Truck and Axle for Car of 60,000 lbs. Capacity:*

This committee is instructed to suggest means for having the axles made uniform in size.

Joseph Wood, Pennsylvania Company, Fort Wayne, Ind., & Detroit, Grand Haven & Milwaukee.

H. Roberts, Chicago, Grand Trunk & Detroit, Detroit, Mich.

M. M. Martin, Wabash, St. Louis & Pacific, Decatur, Ill.

Leander Garey, Hartsdale, Westchester Co., N. Y.

R C. Blackall, Delaware & Hudson Canal Co., Albany, N. Y.

9. *Standard Sizes of Lumber for Freight Cars:*

Wm. Forsyth, Chicago, Burlington & Quincy Railroad, Aurora, Ill.

Frank J. Hecker, Peninsular Car Works, Detroit, Mich.

W. R. Davenport, Erie Car Works, Erie, Pa.

10. *The best Form and Construction of Car Roofs:*

J. D. McIlwain, Grand Trunk Railway (Great Western Division) London, Ont.

Samuel Irwin, Missouri Pacific Railroad, Sedalia, Mo.

L. Packard, New York Central & Hudson River Railroad, West Albany, N. Y.

11. *Subjects to be Reported at the Next Annual Convention for Investigation and Discussion at the Succeeding Convention:*

J. W. Marden, Fitchburg Railroad, Boston, Mass.

John W. Cloud, Pennsylvania Railroad, Altoona, Pa.

Thomas A. Bissell, New York Sleeping Car Co., Buffalo, N. Y.

12. *Committee of Arrangements for the Next Annual Convention:*

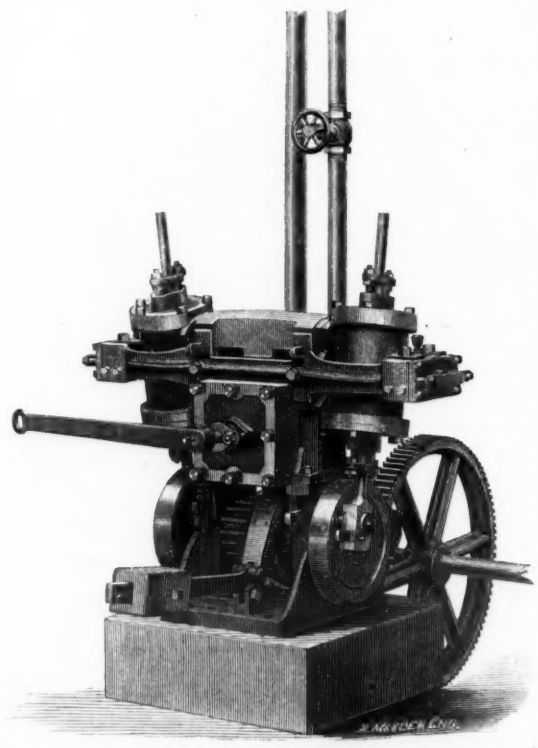
Geo W. Cushing, Northern Pacific Railroad, St. Paul, Minn.

Geo. F. Wilson, Minneapolis & St. Louis Railroad, Minneapolis, Minn.

A promiment machine tool builder writes us: "I agree with you about machine shop graduates. I have always thought that same way, and my experiences as to results are just as you mention, and I suppose many others are the same."

Small Elevator Engine.

Sidewalk elevators are usually run by hand. An engraving on this page shows a two-cylinder, direct-acting reversing engine, built by A. B. See & Co., 120 Front street, Brooklyn, N. Y., for the purpose of running sidewalk and other small elevators by power. The cylinders are 4½″ x 5″, and the whole machine, as mounted on base, is not over three feet high. The weight on lever shown in cuts acts, when steam is shut off, to apply the brake automatically and stop the elevator. It is applicable to elevators previously run by hand, and requires no special attendant.



SMALL ELEVATOR ENGINE.

Repairing Rods.

BY WM. Y. SCHMUCKER.

There are few single jobs in the machinists' line in which as many different mechanical operations are involved in their completion as a connecting rod stub-end. We think that a man who can take hold of a rod in the rough and finish up the stub-ends entire and get everything just right, merits the coveted title of "a good machinist." There is no better test for a new hand. Every apprentice should strive to get a show at a rod; by the time he is through with it he will have a pretty clear understanding of what constitutes repairing a job.

We will here treat especially of locomotive rods; and as the lathe-work, vise-work, and erecting is generally done by different gangs of men in large railroad shops, we intend to give special consideration to vise-work as embodying the main principles in repairing rods.

See that each stub and its strap are properly marked before the rods are taken off the wheels.

As fast as the rods are taken off the pins, the brasses, bolts, keys and liners should be replaced in their respective straps so that the different pieces may not become mixed or lost. After all are down they should be hauled to the vise where they are to be repaired, the rods being placed on trestles of convenient height and the number of the engine marked on them either with paint or steel figures.

The repairing is begun by taking apart and thoroughly cleaning the work, either by the old-time way of wiping with cotton waste, or the more modern method of immersion in hot water impregnated with some caustic like lye or potash. On this instance wiping by hand is preferable. Handle but one strap at a time. The nuts should all be strung together on a wire. Save the liners; if thick liners are badly worn they may be trued up on a shaper. The brasses, bolts, and keys can now be laid out on the bench to be examined (generally by the foreman) in order to determine what new work will be required. The bolts can often be used again if they are still a good fit in the holes, and are not worn at the points where the strap joins the stub top and bottom. Keys can be trued with file and scraper, and straightened at the fire.

After brasses have run six months or a year they will be found to be very loose in their straps and will be larger than the crank-pin on which they bear. The thickness of the brass at the oil-hole, the quantity of motion between brass and strap, the relation of the diameter of the brass to the diameter of pin, the thickness of the liners, and whether or not the old crank-pin will be made to do, are taken into consideration in deciding whether the brass shall be used again or not. If, after the stub has been squared and the strap closed, the brass is still too small for the strap, then relegate it to the scrap-heap. Next put the strap on its stub, skim it off on a planer, and practice true economy by using new brasses, which need no lead filling, no ineffectual and useless filing of the stub end, no liners, and they can be made a snug mechanical fit in the strap and on the pin journal.

The actual repairs are begun by squaring the strap. If the front ends of the main rods have loose straps (some are forged solid with the rod) commence with the cross-head strap of the right side and square all straps that are alike consecutively. Of course it is not absolutely necessary to start with any particular strap, but it is well to have some little system about the work. If the cross-head ends are solid leave them as they are for the present and begin with the main strap of the right side. Clamp it in the vise. Our object now is to make the two inside faces square with the same side of the strap; the side with which the faces show the best will no doubt be adopted, but it would be better if all would make it a rule to square straps with the outside which has been stamped with the letters. Be careful to get both faces of the strap square with the same side. In trueing up straps or any other job exposed to wear or friction, remember that where it is worn the most is where it should be best when repaired.

We will assume that all the straps have been squared and placed on the bench. The next operation is squaring the stubs. Make both faces exactly square with the side to which the strap was trued. The stub must caliper and the surfaces be scraped down to a fine bearing. Then try that strap on the stub to which it belongs; it will probably be too large. It is well to try all the straps, because it sometimes happens that a strap can be made to fit on the stub without resetting. For the guidance of the blacksmith when he closes the straps, gauges must be made (of $\frac{1}{4}$″ or $\frac{5}{16}$″ wire) the exact sizes of the stubs. With each strap send also one bolt belonging to it, so that the smith may be able to keep the holes in line. Put each bolt in its strap, tie the gauge to it and send or take them to the blacksmith shop. While they are there the main rod front ends (if solid) may be squared, made to caliper and faced; the process is the same as with open straps. If the old keys are to be repaired it can be done now. Some may require straightening at the fire. For round edge keys a sheet iron gauge should be filed up with the radius of the keyway in the stub. They are then filed to this gauge and to a straightedge or face-plate. The flat side (bearing on brass) is squared with the side of the key and faced down. Be careful to preserve the correct taper; they may be tried in the keyway, making the key come flush top and bottom with the end of the stub. In sets using keys and gib keys, the gibs cannot be worked on until you have the straps. In addition to the above jobs the wool can be removed from the oilcups and the cups themselves examined, cleaned and repaired. Be particularly certain that the oil-hole is not clogged up.

When you get the straps from the fire they must be refitted to the stubs. Apply red lead marking to both faces of the stub and try the strap on it; if it goes on for only a short dis-

tance it must be filed out until it can slide on the stub its entire length, so that the inside of the closed end touches the end face of the stub. If the strap is too small or cannot be sprung on its stub we bring into requisition that most wonderful and useful mechanical operation called pening. Pene the strap on the inside and it will soon open sufficiently. Or a bolt with a nut may be inserted near its open end, and the nut screwed outwardly until the strap is spread apart to an eighth of an inch or more; it may then be pened at the corners of the closed end (inside) with a hatchet-faced hammer. This spreading with a bolt renders the strap very sensitive, and care must be taken not to pene it too much. If a strap is too large at the open end pene it on the outside of the closed end. The straps must be filed out until they go on the stubs all the way; file according to the marking left by the red-lead. When on the stub examine the strap sidewise, in order to discover any twist in it; find out whether the top and bottom arms of the the strap both come flush with the stub along the sides. Try it also with the holes and keyway; they should be flush top and bottom, and if they are not so must be corrected by the blacksmith. Straps with only a slight twist can be squared up by means of a hydraulic or screw press. When the strap is properly filed out it should be scraped to a fine bearing to the stub. To be correctly fitted a strap should bind the stub so that it can be easily shoved clear up to touch the end face of the stub, and must not be too loose or too tight, but should be an easy fit.

All the straps having been duly fitted to the stubs, the next step is to have all holes rosebitted, which require new bolts. The strap should be set on the stub according to the keyway and firmly held in place by means of a clamp composed of two bolts with nuts and two strips of iron, $\frac{3}{4}$" thick, drilled for the bolts. The clamp is placed across the strap between the two bolt-holes, the cross-pieces of the clamp being suitably recessed in order to clear the holes on each side, and when the clamp is tightly fastened, the holes are reamed.

We are now ready to have the stub ends replaned. The straps must be placed on the stubs, the bolts driven in and the nuts tightened.

After the stub ends are planed stamp the strap properly and retap set screw holes if any. The outside of the stub end should be drawfiled until the tool marks are all obliterated. The surface is then polished with emery paper, used dry first and finished with oil.

After drawfiling and polishing the stub-end, and before the strap is moved, scribe a line across the bottom inside face of the strap at the exact point where it joins the stub.

The stub of the rod is now finished completely; all further dealings will be with the strap and brasses. Remove the strap from the stub, take a wad of oily waste, and grease the stub well to prevent rust and preserve the polish. The brasses are now to be roughed out and fitted in the straps.

The shaper hand will leave the brasses in the straps just as he fits them, and before the vise machinist takes them out they should be marked.

Take the brass bearing on the closed end; make it fit in the strap so that when it touches the bottom, the strap will not be sprung apart any. It should be easy enough to allow it to be moved down against the closed end and back again with the hands only. In order to ascertain whether the strap is spread try it on the stub; make the brasses fit well along the sides also. Apply red-lead to the strap and file and scrape the brasses to a good bearing.

Don't get the brasses too loose If they are too tight it will show immediately by making the strap too large for the stub; a brass should be just tight enough not to spring the strap, and should bear well wherever it has contact with strap or stub. Solid end brasses are fitted in sidewise first and then driven against the side opposite the key (marked with red-lead) by keying up. Be sure to have it come flush with the outside of rod. It often occurs that one corner will project beyond the outside, indicating that the brass has not been filed square with the sides; make it right with a square. A solid brass can be thrown either way by proper filing.

All brasses of the set having been fitted in straps and rods we will now put the brasses in their straps and place them on the stubs, securing them there with one bolt and a key. After the rods have all the straps on and the solid brasses in their places, we will proceed to lay them out for boring. Fit wooden or lead centers tightly in the bores of the brasses (on the inside of the rods); if wood, small tin diamonds may be fastened thereon. We wish now to get the exact center of each brass marked on the tin. Take a pair of compass calipers and set them to the distance from the line dividing the strap from the stub to the outside top edge of brass. With this measurement lay off a line at right angles to and intersecting the parting line of brasses, guiding the calipers by the top edge of brass. Scribe another similar line on the bottom. Then get the center of these two lines with a pair of dividers, lay a straight-edge on the brass and produce the parting line across the wooden center. Where this line meets the center previously found, is the exact center of the brass.

After all the brasses have been centered get

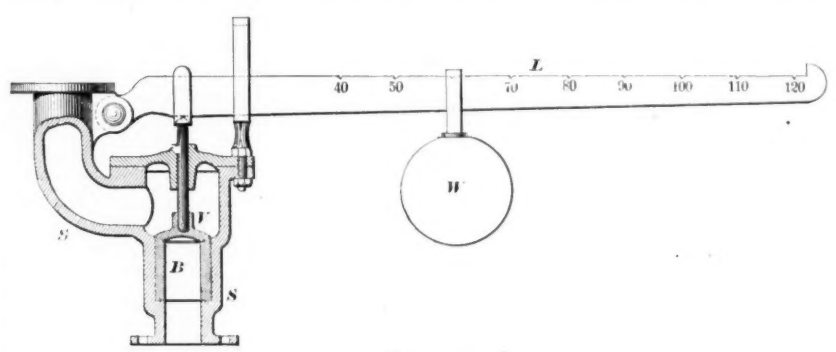


Fig. 1.

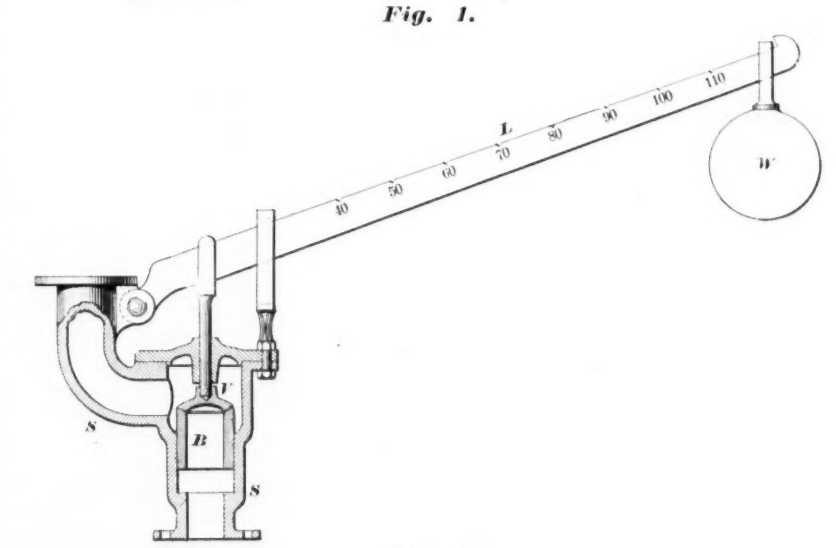


Fig. 2.

the trammel points, and for side rods set them to their corresponding wheel centers on the wheels which are under the engine and have been trammeled. Having properly set the trammels, try the front side rods. If the centers are not correct to the tram the difference must be divided, that is, supposing the trammel to show the centers $\frac{1}{16}$ of an inch too far apart, we throw each center $\frac{1}{32}$ further towards the middle of the rod; if they are $\frac{1}{32}$ of an inch too close together, each center is moved $\frac{1}{64}$ further toward the ends. Or if there are liners in any of the straps the correct adjustment may be arrived at by changing their positions. It will, of course, be understood that the right front and left front side rods, and so on, must be adjusted to the same tram and made exactly alike as regards distance from center to center. The main and side rods having all been correctly trammeled and centered, we draw a circle on the brass, using the centers just found. This circle is for the guidance of the lathe hand who is to bore the brasses. When the brass has been bored, scribe off the oil hole, file it out and chip oil clearance in the brass. Begin $\frac{1}{4}$" in from each side, take a chip about an eighth of an inch wide to the oil hole, and smooth it up with a file. Polish the brasses on the edges first, in the vise; the corners may be rounded off or left square according to taste. Break all the corners and edges of the strap and polish. Key the brasses in the strap and polish the sides with smooth file and emery paper. Put the brasses and strap on the stub, insert bolts and keys, and draw up the nuts. Repair and polish set screws and oil cups, insert them in their places, and the rods are finished.

Peculiar Antics of a Safety Valve.

In the discussion of Prof. Sweet's paper, "The Unexpected Which Often Happens," at the Boston meeting of the American Society of Mechanical Engineers, Mr. W. F. Durfee said:

"Here is a case of the unexpected that occurred to me some seventeen years ago. I had an ordinary locomotive boiler unprovided with any pressure gauge, but having a safety valve which was believed to be reliable, whose lever was graduated to 120 pounds. The man who was in charge of the boiler was instructed to keep the steam pressure at 60 pounds. The boiler was an old one, having been in use at least ten years, and how much longer I do not know. After the boiler had been at work for two or three weeks its fireman came running to me one day with every limb and feature indicative of extreme terror. As soon as he could speak he exclaimed: 'The divil's got in the boiler, Mr. Durfee!' 'What do you mean John?' said I. 'The divil's got in the boiler, I tell ye; fur the weight's on the ind iv the liver an' 'tis up in the air as high's it con git; an' divil a mite iv stame's comin' out!' 'Well,' I replied, 'we will go down and see if we can get the 'divil' out." On reaching the boiler I was surprised to find the weight at the 120 pound notch, and that it was as high as it could 'git' (Fig. 2) and to my utter astonishment there was but a suggestion of steam escaping. My first thought was that in my immediate vicinity a boiler explosion was imminent; however, there was nothing to do but to ascertain the cause of existing conditions, and I therefore immediately tried the gauge-cocks, found two full gauges of water, and, from the appearance of the steam which escaped on opening the upper cock, it did not seem possible that there was 120 pounds of pressure upon the boiler. I then took a fire-hook, and, without much effort, pulled the safety valve lever down, but on being released it slowly returned to its rampant position, and at no point of its movement was there any increase in the very small and feeble volume of steam escaping. I repeated this experiment with a like result, and then began to think that John's diagnosis was correct; for the boiler certainly seemed to be 'possessed of a devil.' Just how he got in, and how he produced the observed effects, I could not imagine; my previous experience with steam machinery, which I had been in the habit of regarding as embracing every species of 'pure cussedness' that steam generators were heir to, did not furnish any clue to the mystery—for mystery it certainly seemed, and one which required prompt and decisive action for its solution. I therefore ordered John to draw the fire as quickly as possible, and in due time the valve was dismounted, and the state of facts disclosed is represented in the accompanying cuts (Figs. 1 and 2) which show the interior of the valve after, and before, it became 'possessed of the devil' of deadly danger.

"The engravings so clearly exhibit the details of the valve, and the relative position of its several parts, that very little explanation is necessary, and it will suffice to say that the shell *S*, of the valve, was of cast iron, bored out to receive a cylindrical gun-metal bushing *B*, which was forced into its place, and held there simply by friction. On the upper end of this bushing the seat of the valve *V* was formed. As long as the bushing *B* remained immovable, the steam pressure acted on a circular area of the lower surface of the valve *V*, having a diameter equal to that of the interior of the bushing *B*, but as soon as the repeated expansions and contraction incident to use and years had loosened the bushing *B*, the circular area upon which the steam could act had a diameter equal to that of the exterior of the bushing *B*, which, with the valve *V* resting upon it, was then free to move upward (see Fig. 2) as far as lever *L* would permit, acting simply as a piston, and affording no outlet to the steam save that due to the trifling leakage arising from its imperfect fit in the shell *S*. The area of the last-named circle was a little more than double that of the first.

"It is not uncommon for a coroner's jury, while attempting to ascertain the cause of some disastrous boiler explosion, to be told by the confident witness (he is always on hand in large force on such occasions) that 'the safety valves were all right, as they had been examined but an hour before the explo- occurred.' Such evidence in the case of a safety valve like the one which I have described would be of no value whatever, as the fact of its being in good order when examined would be no assurance that within the next five minutes it would not be worse than no safety valve at all. It is extremely probable that there are many such valves in use to-day, and also that valves of such construction have been the cause of many unexplained explosions."

Has the Engineer Control Over the Wear of Tires?

J. H. Setchel, Secretary of the Railway Master Mechanics' Association, has sent out the following circular:

To the American Railway Master Mechanics' Association – Gentlemen:

The undersigned desire answers to the following questions:

1st. Has the locomotive engineer any control over the wear of tires?

2d. If so, in what way?

3d. What is your method of determining the wear of tires?

4th. Do you have regular engineers on your locomotives?

5th. Will tires run longer between turnings with regular engineer than with different engineers?

6th. Is a free use of sand desirable or not as regards the wear of tires? Give figures if possible; if not, the experience of yourself or engineers.

FRED. B. GRIFFITH,
J. S. GRAHAM,
JOHN MACKENZIE.

All communications should be sent to John Mackenzie, Supt. M. P., N. Y., C. & St. L. Ry., Cleveland, Ohio.

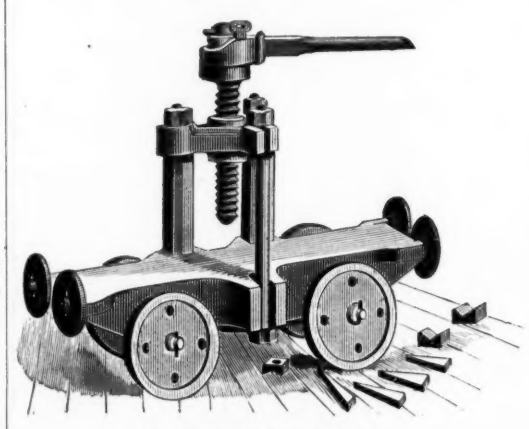
Marshall's Shaft Press.

The shaft straightening press shown by cut herewith has been designed and placed upon the market by G. M. Marshall & Son, Kilbourne City, Wis.

The machine weighs about 1,700 lbs., is 4 feet long, on 18 inch wheels, axles $1\frac{3}{4}$ inch wrought iron. The screw is of steel $22x2\frac{3}{4}$ inch, supported on spools held by three $1\frac{3}{4}$ inch bolts. The nut of brass, 6 inches long, has top washer. It is operated by a sliding latch, either way, and lever need not be taken out, as small space is needed to operate it. The front bolt can be taken out to get in long bars and be replaced in a moment. Three screw or shaft blocks, 4 wrought wedges and 4-foot steel lever accompany the machine.

The makers say that the power of three men on lever will straighten 6 inch bend on 2 inch up to 24 inches on 4 inch iron shafts.

The advantage of a powerful screw over the usual sledge and anvil process to straighten any shaft in shop practice must be apparent, as time is saved, work is not pounded up or injured in any way nor liable to be broken. But when an ordinary shaft can be trued up without leaving the machine, the advantages are greater. This is done on end rollers—seen in cut—and usually enables the operator to put his shaft in shape without the use of a lathe.



MARSHALL'S SHAFT PRESS.

Labor Matters that Should be Studied.

The Thirteenth Annual Report of the Pennsylvania Bureau of Industrial Statistics is a volume of great interest. It is a compendium of facts relating to the chief industries of that State, and is deserving of a wider circulation than 4,500 copies, the number ordered printed. In reviewing the work of the Bureau its chief, Joel McCamant, treats plainly of labor matters. As his utterances are not those of a theorist, but of a veteran collector of facts in this line, we quote at length from his review:

CONTRACT LABOR.

In a former report I discussed the evils incident to the introduction of imported contract labor. Some features of the recent labor troubles throughout the country have tended to confirm me in the views then expressed. The vast majority of wage workers in this country, whether native born or those emigrating here of their own accord, are intelligent, industrious and law-abiding. But hordes of pauper laborers, strangers to our language, and without a knowledge or appreciation of our institutions, have been foisted upon us through the greed of selfish contractors. By such importations of labor, a momentary gain to the contractor is attained, but the seed of discontent is sown in the minds of our industrial population, and missionaries of ignorance, crime, violent communism, and anarchy are let loose upon the land. That the result should be riot and bloodshed is not surprising. We refer with pride to the building of great public works, and the yearly construction of thousands of miles of railroads, for the reason that such improvements are looked upon as an index of national and State prosperity and progress. But if the unwarranted profits of the enterprise accrue solely to the contractor, while the masses of the people are proportionately impoverished by reason of the introduction of an unnatural and unlawful competition, then such public works present no evidence of national prosperity or progress, and will prove a curse instead of a blessing. The introduction of imported contract labor is a natural and reasonable cause for discontent among our own workingmen. The old maxim is that the laborer is worthy of his hire, and he should be subjected only to just and healthy competition. He naturally and justly expects to be benefited, not injured, by the material and intellectual progress of the nation. This evil, I am gratified in being able to state, is gradually being recognized and frowned upon by the employer as well as the employed.

STATUS OF THE WAGE-WORKERS.

There is no question more difficult of solution, nor one more urgent in its demand for a wise settlement, than that of the relative position in the future of the wage-workers to other laborers, physical and mental. The first and greatest step toward its solution is the full recognition in the public mind that the question itself has an actual living existencce. That it does exist, although perhaps not clearly formulated, is evidenced by discussions in the press, the pulpit, and legislative assemblies, by the increase and growing power of labor associations, the demand for higher wages, for less hours of labor, for increased privileges, and by strikes, even where the claims made are apparently unsubstantial and intangible. The more quickly the fact of the existence and importance of this question is recognized, and earnest, honest, and able men of all conditions in life unite in an effort for a solution of it which will render justice to all, the more quickly will threatening dangers be averted. All facilities for the enjoyment of physical and intellectual culture have accumulated. In these changed conditions, the wage-worker feels that he is deprived of his rightful share of the accrued benfits. The rich and the poor are further apart than ever before. True, there has been an advancement for both, but not in proper proportions. With many modern improvements, greater wants and higher aspirations have arisen. Luxuries of a few years ago are the necessities of to day which the laborers' wages are often not sufficient to supply. How to adapt himself to the new conditions, is the problem he is seeking to solve. How to rise to his proper status, he does not fully understand, and, naturally, a vague but positive feeling of discontent is engendered by this inability. That, under such circumstances, a large crop of pretended political economists, of various grades of ignorance, should come to the surface is but natural. Among the many propositions advanced by this school of economists is the absurd one that a cheap, plain, and uniform diet should be adopted and adhered to by laboring men. A New England philosopher has evolved what he considers the startling fact that New England intelligence, which is of the highest degree, is based on a diet of pork and beans; consequently that pork and beans should be the workingman's food. As well might it be argued that the unwearied industry and sterling honesty of the Pennsylvania Dutchmen have their foundation in "speck and sourkrout;" or that the late civil war had its origin in a general and indiscriminate use of "hog and hominy." It is as illogical to regulate the diet and make the manner of living of the poor conform to unbending rules as it would be to establish inflexible regulations for the diet and mode of life of the rich. The use of the products of the earth, the loom and the anvil, will be and should be regulated only by the means to purchase and the tastes of the consumer. The more general the means of distribution, the more completely will consumption conform to a production which fully employs labor. To solve the labor question, it must, as before suggested, be fully understood to exist, and then be solved in a way consistent with moral, mental, and material progress. When this is properly understood, a great step will have been taken toward its proper solution. With a just acknowledgment of the rights of the wage-worker, I have firm faith that a solution satisfactory and beneficial to all will be arrived at. In the words of Bishop Potter, of New York, in a late pastoral letter: "What the laborer wants from his employer is fair and fraternal dealing, and a recognition of his manhood, rather than a condescension to his inferiority." If the wage-worker is met in this spirit, good results must necessarily follow. To so meet him is not only politic, but right; for, again quoting from Bishop Potter, "No Christian man can innocently be indifferent to the interests of working men and women."

EIGHT HOURS FOR LABOR.

One of the demands now being urged by the wage-worker is, that the standard measure of a day's work be fixed by law at eight hours. It is a subject which, in a review of the labor situation by the Legislature, should receive earnest consideration and attention. The laborer has but slowly and painfully emerged, in the lapse of ages, from slavery, serfdom, and villeinage to his present status, and to fewer hours of work and lighter toil. In each step of his progress he has met opposition, and he has reached his present position despite the gloomy prophecies and predictions, by so-called economists, of the financial revulsions and ruin which must ensue from the attainment of his rights. In the seventeenth century the common laborer in England, according to Macaulay, received but sixteen cents a day, and the skilled mechanic but a shilling.

In those days, as now, complaint was made of the high wages paid. A member of Parliament, in 1680, said, in a speech, that English manufactories could not thrive because the English mechanic demanded a shilling a day.

In 1845, when the ten-hour bill was introduced into the English Parliament, it was opposed by Richard Cobden and John Bright, both of them recognized friends of the laboring classes. Its passage, it was foretold, would be utterly ruinous to the manufacturing interests. Yet in 1847 such a bill became a law, was enforced, no one was ruined, and the rate of wages, instead of diminishing, increased. John Bright, twenty-one years later, acknowledged the fallacy of his former views, and said: "If the Government were prudent, economical, and just, every man in England might have his daily labor lessened by not less than two hours without the slightest diminution of his comfort."

The opponents of this measure charge that the wage-worker does not require less hours of labor, therefore the arguments that are advanced to shorten them are sheer demagogism. Charles Sumner was not a demagogue, but he wrote from the United States Senate chamber, May 25, 1872, and said: "I declare my sympathy with the workingmen in their aspirations for greater equality of condition and increased opportunities. I therefore insist that the experiment of an eight-hour law in the national workshops shall be fairly tried, so that, if successful, it may be extended. Here let me confess that I find this law especially valuable, because it promises more time for education and general improvement. If the experiment is successful in this respect, I shall be less curious on the question of pecuniary profit and loss, for to my mind the education of the human family is above dollars and dividends." The ritual of Free and Accepted Masonry, the oldest of all secret orders, is not considered demagogism, and it expressly recognizes the division of the day into three equal parts—eight hours for labor, eight hours for sleep, and eight hours for the service of God and man.

The same reason which induced the passage of the ten-hour bill, operates with greater force now. The advance of civilization, with new inventions and improved machinery, have lessened labor and increased production. One of the benefits of progress claimed by the workingman as owing to him, is a reduction of the hours of labor. Under the present system of distribution, he is not able to consume sufficient of the increased product to justify his employment at full time. Steady work and no enforced idleness he earnestly desires, and his hope is that such a desideratum can be reached by reduced hours of labor.

That eight hours will, in the not distant future, be the standard measure of a day's work, is, in my opinion, beyond doubt. It is in accord with the spirit of the age and our advance in the material arts and sciences.

STRIKES AND LOCK-OUTS.

If we take into consideration the fact that during the past year there has neither been a commercial panic nor an appreciable revival in business, the number of strikes and lock-outs may be regarded as phenomenal. There have been a number of strikes in Pennsylvania, but none of a very serious character. There were about twenty in the textile industry, but they lasted only a short time, and occasioned no very great inconvenience. There were comparatively few among the iron and steel industries, which are generally prolific in strikes. In the south-western part of the State there were several for advance of wages, but as the demand made was granted, they were not of lengthy duration. The most serious list of strikes is furnished by the bituminous coal fields. The miners along the Monongahela river and the miners and coke men in Fayette and Westmoreland counties struck for higher wages. In this strike there were about fourteen thousand employes engaged, and in several instances riot and bloodshed resulted. Nevertheless, in number and magnitude of strikes, Pennsylvania bears no comparison to those in other manufacturing and mining States. The "Wallace Voluntary Trade Tribunal Act" is as near perfect in its provisions as can well be devised. When there is a desire to arbitrate, this law affords a ready means by which a settlement can be effected. But the real difficulty is that when men's passions are excited to the verge of lawlessness, they do not sit down calmly to reason together; the disposition then is to fight. Not only is the proposed submission to a tribunal voluntary, but the tribunal itself is without practical power to enforce its decrees. Very frequently, whatever may be the avowed object of a strike, the real point in controversy, neither party is willing to submit to an umpire. Notwithstanding this, arbitration is the true remedy, and doubtless the time will come when it will be acknowledged as the only successful means to end vexatious disputes between the employer and employe. The great body of the best of the laboring classes have learned, and possibly all will learn sooner or later, that whatever may be the wrongs of the workingman, a strike generally brings, without compensatory benefit, disaster and suffering to the striker and his family; and where it does not ruin, often so impairs the capital of the employer as to deprive him of the means of successfully conducting the industry in which he is engaged. During the pendency of a strike the vital powers of a trade—production, consumption, and proper distribution—cease. The right to strike, like the right of revolution, is inherent, but should only be asserted as a dernier resort.

The practical settlement of labor troubles by means of arbitration is not yet attained, but it is attainable. Legislation, so far as practicable, should promote such end. It is only during the present generation that the legal right of laborers to organize for mutual protection has been recognized by the courts of law. This right, until a comparatively recent period, has only been acknowledged grudgingly, and even at the present time by many well-meaning men is feared as being subversive of law and order. Fear of this kind is groundless. Instead of being denounced, such organizations should be permitted to legally incorporate. Under proper regulations and the influence of wise councils, from corporations of this character there need be no cause of fear. They must be recognized as men, must be trusted as men, and they will not prove faithless. There need

be no shrinking from and fear of exposing the details of business. But a few years since, and the anthracite coal region of Pennsylvania was the scene of labor troubles and protracted strikes. In that region strikes are now infrequent, and for the reason that existing business conditions are openly avowed, and a basis of wages contingent upon such conditions fixed. If we do justice to the workingman, and trust in his intelligence, the result will be for good.

INDIVIDUAL RIGHTS.

The right of labor to organize is the culminating growth of centuries, and is evidence not only of its increased power, but also of the progress of a liberal civilization. Capital and labor unite for the purpose of production and dirtribution—they diverge in a dispute as to a division of the profits. Capital is concentrated, governed by single intelligence, is conservative and oftentimes selfish and tyrannical; labor is diffusive, naturally disorganized, well intentioned, but frequently arbitrary and unjust in action. Labor is divided by numberless and divided councils. By many wage-workers the encroachments of capital are dreaded, and as a consequence labor organizations are formed, in which control of individual action is surrendered for what is deemed the general good. By others, the entire right of personal action is insisted upon and the edicts of trades-unions are defied. These conditions naturally inspire triangular conflict. The capitalist, governed not only by selfish motives and a desire for profits, but also by the dread that the increasing power of labor will deprive him of all but a nominal control of his own property, stands in opposition to the claims of both organized and individual labor. But it is organized labor that the capitalist most fears, and, therefore, it is with it that he most strongly contends, and encourages individual action. All laborers sympathize in the demand for a just recognition of their rights, yet the decrees of organized labor are repudiated by unorganized labor. The result sought to be attained by organization being thus prevented, angry controversies arise. The animosities between the different classes of wage-workers are consequently often more relentless than between labor and capital. Capital is the base line of the triangle which labor approaches by diverging lines, one through trades-unions and the other through individual labor.

Each party to the triangular conflict loudly proclaims the doctrine of individual rights and liberties. And each party is justified in the claim made. The difficulty, however, is that each, while demanding its own, neglects to fully recognize the rights of others. The right to hold private property and to have such property protected, is fundamental to our system of government. Yet such right is held in common with the individual right to labor and to organize to protect such labor. Neither capital nor labor has the right of encroachment. National liberty consists in the surrender of individual liberty, so far as such surrender is essential to the common welfare. For labor to attempt to absolutely control capital is wrong and should be resisted; but for capital to attempt to discourage and break down labor organizations, is equally worthy of reprobation. Wage-workers have a right to organize, and through such organizations seek self-protection. But such organizations are simply voluntary, though lawful, and not obligatory upon the laborer. It is a matter of individual judgment to him as to whether he shall or shall not join an organization which requires him to surrender a portion of his individual liberty for what is deemed the common good, or whether he shall retain the right to personally control his actions.

Individual competition may, and frequently does, lessen the effect of organized effort, but the right of the individual is as sacred as the right of the trades-union, and the market for labor is, by law, as open to one as the other. The effort to dictate to the employer as to whom he shall employ or discharge, is not only unlawful, but cannot be successfully maintained. To prevent individual labor from working on its own terms is equally unlawful. Unfortunately, from the misunderstanding of the rights of others, many of the conflicts between labor and capital have arisen and bloodshed and riot ensued. No one is more interested than the laboring man in maintaining the principles of law and justice. Only through these can he hope to attain success. Labor is a high and mighty force, but if it invokes destruction and defies law it hastens its own downfall. It may disrupt society, but it will, as to itself, undo the work of centuries. The present period is one of danger, but if prudence is observed by all classes, and just rights maintained and advanced by well-chosen argument, based upon acknowledged truth, an era of unexampled prosperity, national and individual, is before us.

LETTERS FROM PRACTICAL MEN.

Success in Shop Management.

Editor American Machinist:

Frequently of late I have been requested by a number of shop managers, most of whom are readers of your paper, to tell the secret of my success in shop management.

It is a hard question to answer, but I will in a simple way through your paper try and explain how I manage the gas fixture factory of which I am superintendent. When I first took charge I found everything out of joint, and such a thing as system utterly unknown.

The first few days I let things go on in the old way until I became acquainted with the men and the men with me. I then set about to bring order out of chaos. My first step was to discharge every man who I found unwilling to submit to the new order of things. The first man discharged was the engineer. He had done as he pleased so long that he had an utter contempt for law and order. On finding himself locked out of the factory for disobedience he kicked the door down. A few more discharges followed, which proved sufficient to convince the men I meant business.

I then divided the factory into five departments, picking out in each the brightest fellow to act as foreman. In each department I put a responsibility upon each man, that he might feel himself of some importance. I interest myself fully in all things transpiring in each department. When I arrive in the morning I am very careful to visit each man at his post and say good morning. I ask after those absent and visit the sick. At night I place myself so all have to pass me and say good night to each.

I have at all times treated every one like a gentleman. What is the result? Every man is doing his duty. The factory is turning out more goods with fewer hands. We have a place for everything and everything is in its place. The factory is clean, and I feel that I have the respect of every man about the place. I think then the secret of my success in shop management is

"Do unto others as you would have others do unto you."

THE SUPERINTENDENT.

Tinning a Soldering Iron.

Editor American Machinist:

Stepping up stairs one day to make a short call on Jonas, I found him just ready to begin that job that most machinists hate, *i.e.*, to tin a soldering iron. He asked me how I tinned a soldering iron.

"Oh," I said, "I get a brick and worry a long hole in one side; in this hole I put some rosin and a few little drops of solder. Then I heat my iron (why does every one say iron when they mean copper?), give it a wipe on a wet rag, then go for the excavation in the brick. I jam the point down and rub it back and forth vigorously, turning it over all the time, and cussing a little under my breath, the same as everbody else does, when I see that the first scald does not do the work."

"Well," said he, "I used to do that the same way, but I don't do it any more. This is the new method." And he put the hot "iron" in the vise, gave one side two or three rubs with a mill file, touched the filed side with a bit of rosin with one hand and followed it immediately with a touch of solder held in the other. The result was one side perfectly tinned. The process was repeated on the remaining sides, and the job was done in less than 30 seconds.

I went down stairs slowly, thinking of the years that had been and would be wasted by mechanics trying to tin soldering irons with profanity and a hole in a brick.

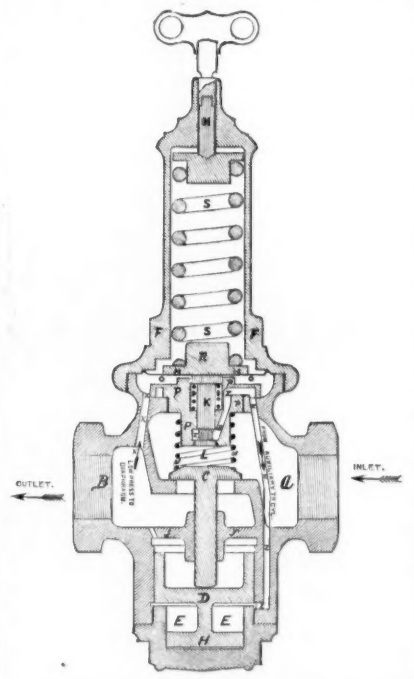
F. L. JOHNSON.

Waukeska, Wis.

Heating Foundries by Steam.

Editor American Machinist:

There are no shops that are as poorly heated, as a general rule, as foundries. And if there is any workshop that should be made comfortable, it is the foundry in winter time. And this can be done by heating them by steam. But some foundrymen say that they do not like steam pipes in a moulding room; that something is falling against them and breaking the joints, and steam is apt to escape. This can be all overcome by placing the pipes above the windows, instead of below; and the exhaust water can be made to run back in the boiler, and in that way very little coal need be used. Some persons are apt to say that a shop cannot be made warm in that way of heating. The first time I ever saw it tried was in the winter of 1880, when I was foreman of the B. F. Sturtevant Blower Works' foundry, Boston, Mass. I understand the Messrs. Barnes, of Rockford, Ill., have tried the experiment of overhead steam heating in their works, with great success. In this way of heating foundries it is not



THE MASON REDUCING VALVE.

only cheaper, but more comfortable for the moulder, and it is much more pleasant in the shop than gas from coal stoves; besides, it is cleaner in the shop. If there is anything that looks bad in a foundry, it is a pile of caoal ashes, and I am sure moulders do not like ashes to be getting in their sand heaps. There is one thing more in favor of steam heating; that is, the uniform heat in the shop that stoves do not give.

DAVID SPENCE, Foreman.

Locating the Pattern Shop.

Editor American Machinist:

You ask for a logical reason for locating pattern shops in the top of buildings. I think there is no better reason than that room can be utilized for no other purpose. When owners and managers can be brought to recognize the fact that pattern making is as much a necessary part of manufacturing as the drafting room, machine shop and foundry, then will pattern shops and storage rooms be located with reference to getting out the work economically. Money will be liberally used in the fitting up of drafting rooms and in the purchase of tools and appliances for the machine shop, and sometimes for the foundry, but in fitting up pattern shops a little money must go a great way.

Much has been and much more may be written and printed, and not exhaust the subject of pattern making. New features are presented with every job which can be dealt with by no set rule or staple method, but according to the necessities of the case, taking into account the number of times the pattern is to be used, and the importance of the casting to be made from it. The man who executes his orders quickest and best and studies to do this, is the man who is called lucky by his shopmates when advanced in wages and promotion.

Young men who read the AMERICAN MACHINIST, a word of advice: Study drawing, and practice it too with instruments and free hand; learn to talk with your lead pencil. Visit the foundry too, every chance you can get, learn how they do things there, and the difficulties and inconveniences the moulder has to struggle with and take him into account when you build your patterns and you will prosper.

PATTERN MAKER.

Crank-Pins.

Editor American Machinist:

Replying to Mr. Geo. Osborne's remarks relating to crank-pins, I would say that I have had some experience with steam engines for at least ten years, and have come to the conclusion that when a crank-pin wears only on one-half of its surface it indicates that the engine is very much out of line, and should be immediately lined up correctly. It is improbable that parts of an engine which is in line should wear as Mr. Osborne states. We have an engine in our shop which is over 40 years old, and has done a great amount of work. Its crank-pin boxes are worn as evenly as any one could desire. Taking these boxes out the other day I found that they needed to be filed up, and further than this needed no repairs. Keep the engine lined up correctly and in good order, and thus avoid all trouble. I would like others to state their experience relating to this subject.

W. H. CARR.

Bath, Me.

The Mason Reducing Valve.

The Mason reducing valve is designed to reduce and maintain an even steam or water pressure regardless of the initial pressure. The high pressure enters the valve at the side marked "inlet," and passing through the auxiliary valve *K* which is held open by the tension of the spring *S*, passes down the passage marked "from auxiliary to cylinder," underneath the differential piston *D*. Raising the piston *D* the valve *C* is opened against the initial pressure, and steam is admitted to the low pressure side of the valve, whence it passes up the passage *X* underneath the diaphragm *O O*, upon which the spring *S* bears. When the low pressure has risen to the required point, which is determined by the tension given by the key to the spring *X*, the diaphragm is forced upward, the valve *K* closes, and the valve *C* is forced on to its seat by the initial pressure, there being then no steam admitted under the piston *D* to hold it up. This action is repeated as often as the pressure on the outlet side drops below the required amount. The piston *H* is fitted in the dashpot *E E* to prevent chattering or pounding when the pressure suddenly changes. This valve is manufactured by the Mason Regulator Company, 22 Central street, Boston.

The Chicago Industrial *World* says:

A somewhat singular accident took place in the City Hall Monday evening. The valve stem used in operating one of the Public Library elevators broke, causing the water to rush into the hydraulic cylinder at a great rate, which sent the car upwards at a speed which threatened to crush it against the roof and break the cables. The operator, who happened to be alone in the car, was almost frantic with fright, and tried to jump out of the ascending cage, but the wire doors being closed he was kept in, and his life probably saved in consequence. The cables were not broken, but no further use could be made of the elvator that evening, and extensive repairs were rendered necessary. This is the car that was not tested by the Elevator Inspector, for the reason that as the other had answered all requirements, this one, having been constructed in a similar manner, must of necessity be all right.

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NEW YORK, NOVEMBER 13, 1886

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A Standard for Catalogue Pages.

We have often called attention to the importance of having trade catalogues well printed on good paper and illustrated with good wood engravings as well as to have the descriptive matter intelligible and free from boastful verbiage. We have also referred to the desirability of having catalogues dated, so those referring to them can know how old are the improvements mentioned therein, also whether the prices (when named) are "war prices," or those now prevailing. There is another consideration regarding catalogues which deserves public attention, inasmuch as it involves some degree of co-operation on the part of catalogue makers. Uniformity in the size of pages would be an immense improvement over existing conditions. We have a large collection of machinery and tool catalogues, but as there are from a dozen to twenty different sizes of pages we find it next to impossible to make any arrangement of them upon shelves or in drawers so as to render any single one wanted, readily found. There is nothing in any of them that would not be as well represented in one of three standard sizes of page: the pocket size, the octavo, or the quarto. If all were included in those regular sizes we should have them bound in groups and indexed so that both catalogue and contents would be easy of reference, and we feel assured that the principal purchasers of machinery tools and supplies would preserve them in that way. The preservation of a catalogue in a stack of pamphlets of promiscuous sizes is not apt to be of very high value to the publisher. Circulars are usually deposited with care in the waste paper basket. If they were printed as a rule with pages of standard octavo size the probability of their being preserved and bound would be increased at least a hundred per cent.

As this is a matter that would require concerted action among manufacturers it could be accomplished only through some organization. The American Society of Mechanical Engineers has made some progress in bringing about the adoption of certain standards in machinery. We suggest that a committee on standard catalogue pages be constituted at its next annual meeting in this city, the latter part of this month. The catalogue page standard presents by far fewer difficulties in the way of general adoption than any standard for machinery. Its benefits must be apparent to any manufacturer who carefully considers the matter.

Making Good Articles Sell.

A reader, who says he is a "seven years' subscriber," sends us the following exuberant remarks, from which we infer that he is doing well in his new shop venture:

"Probably you may think me terribly conceited. But I can tell you it gave me a good deal of satisfaction to read that article in your last issue on "Machine Shop Graduates." Of the large number of men that have been employed by Lighthall, Beekman & Co. and their successors, the Lidgerwood Manufacturing Company, I believe I am the third that has started for himself, and the only one who has started manufacturing a patent article of his own invention.

"This exuberance of conceit may probably be accounted for by the fact that the writer is a canvasser of his own article. From time immemorial tradition has credited canvassers with the possession of unconsumable gall. But if an inventor don't enthuse over his own article, who will?"

The writer of the above need not offer any excuse for enthusiasm. The men who succeed are almost always distinguished for their enthusiasm. If a person is convinced that he has an article of decided merit to put before the public, it is best to do so in an enthusiastic way. In business, as well as in war, it is desirable to "push things" when opportunity offers. True enough, there are men who have abundance of ability and perseverance to manufacture goods, yet who lack the energy and confidence necessary to make the public buy them. Such men ought not to start in business for themselves unless in partnership with others who have the qualities in which they are deficient. A great many meritorious mechanical articles have been brought out in this country within the last ten to fifteen years that are now lying dormant, because their owners lack the confident enthusiasm required to make them sell. Most of them think it is the lack of capital. Occasionally a man who has energy for selling good articles discovers one of them stowed away under some bushel (waiting for capital), forms an alliance with the owner, and brings it to light without any large investment, and makes it commercially successful. The owner is then convinced, in his own mind, that times have greatly improved since he first brought out the article. Probably, being thus encouraged, he will bring out another good article, hide it in a well, and go through the first part of his former experience. If the last state of the man is not worse than the first, it will be because some enterprising individual, with the ability of a "canvasser," comes along and rescues the new article from oblivion.

If a person has designed a really meritorious mechanical article, and finds great difficulty in introducing it, he should study carefully to determine whether the fault is not more in himself than in the lack of capital or the dullness of public appreciation.

Master Mechanics and Master Car Builders Conventions.

It has been decided to hold the next convention of the American Railway Master Mechanics Association at St. Paul, the third Tuesday in June, 1887, and the convention of the Master Car Builders Association one week earlier at Minneapolis. The two cities join corporate boundaries, and their business centers are but ten miles apart. They are increasing in population and resources at a greater rate than any other cities in the United States which have exceeded a hundred thousand population. The two associations will be well received, and nobody who has observed the enterprise and public spirit of the people of those cities will doubt that the members will have their stay made pleasant. On another page this week we present the official circular of topics to be discussed by the Master Car Builders.

Literary Notes.

Mr. Lewis F. Lyne, superintendent and electrician of the Jersey City Electric Light Company, is preparing a book entitled "Wrinkles in Electric Lighting." It will be different in its treatment of electrical matters from the books now before the public, inasmuch as difficulties that often arise will be described, together with their remedies. There is a lack of practical information on this subject, and Mr. Lyne proposes to supply it. It will be a volume of about 600 pages.

Worthington's Annual for 1887 is "a series of interesting stories, biographies, papers on natural history for the young, illustrated with upwards of 300 engravings by the best artists." It is beautifully printed with colored plates, has 214 pages, sells for $1.50, and is just the kind of book to buy for a holiday present to children. Published by Worthington & Co., 747 Broadway, New York.

The *Sanitary Engineer* of Oct. 23d publishes an accurate description of the Statue of Liberty, which was dedicated last Thursday. Detail cuts are shown, and all the engineering features are explained. The statue is not only a work of art, but together with its pedestal presents many interesting points in engineering. The same issue also contains illustrations of the bursted water-tower at Sheepshead Bay, L. I. This tower was 250 feet high and 16 feet diameter at the base. It was built of steel plates, and burst when nearly full of water at its first trial. The article accompanying the cuts is of considerable mechanical interest.

SHORT LECTURES TO ELECTRICAL ARTISANS. Being a course of Experimental Lectures delivered to a practical audience. By J. A. Fleming.

These lectures treat on subjects connected with the principles underlying modern electrical engineering. The author does not claim to present a connected exposition of even elementary principles of electro-technics, but is desirous that practical training should be supplemented by some attention to theory. The subjects to which attention is directed are those involved in everyday experience of electrical artisans, and aim to bring home to these craftsmen the scientific principles involved in daily work which pass under their hands.

The author states these scientific principles in plain and simple language, so that persons not acquainted with the elementary principles of electro-technics will have very little or no difficulty in following the author through the volume, and be greatly benefited by it. We believe that it will be useful to practical students to read this work as an introductory to larger treatises. The volume contains 208 pages with 74 illustrations. The price is $1.50, and is published by E. & F. N. Spon, 35 Murray street, New York.

SQUARE ROOT MADE EASY: PRACTICAL HINTS for Self-Instruction. By Robert Grimshaw, M. E., New York. Published by Mechanics, 5 Dey street. Price, 50 cents.

The object of the author of this little work is not to illustrate any new discovery in mathematics, but to show the reason for the processes of extracting the square root. He says, very truly, in his preface:

"Many have not sufficient book training to enable them to attempt it, and the rules in most books are so complicated or confusedly explained as to make the task difficult and the result unreliable even to those who have access to the book rules."

Shoppel's Modern Houses for October is before us. It is a large illustrated architectural quarterly published by the Co-operative Building Plan Association, 191 Broadway, at $1.00 a copy. The plans for houses are numerous and good, besides which the publication contains other matter of interest to house builders and owners.

QUESTIONS AND ANSWERS.

Under this head we propose to answer questions sent us, pertaining to our specialty, correctly, and according to common-sense methods.

Every question, to insure any attention, must invariably be accompanied by the writer's name and address. If so requested, neither name, correct initials nor location will be published.

The answer to question No. 387, in our last week's issue, was a teetotal mistake. It got into the paper through an accident. Taps are made complete "releiving" and other cutting by machinery; and in the first issue of the AMERICAN MACHINIST, November, 1877, we noticed the process of making them by machinery. No file is used in the manufacture of taps.

(390) J. B. C. asks: 1. Will J. G. A. Meyer have the papers on "Modern Locomotive Construction" and "Practical Drawing" published in book form? *A.*—Yes. 2. Is it good practice to return the water from a surface condenser to the boiler? *A.*—We prefer not to do so. 3. Which is the front end of cylinder of a horizontal engine? *A.*—The end furthest away from the crank is generally considered to be the front end. 4. Where can I get a copy of a paper called the *Stationary Engineer*? *A.*—Address to 181 Broadway, New York.

(391) E. W. asks: I. What is meant by the "lap" of a valve? *A.*—See article on "Modern Locomotive Construction" in the AMERICAN MACHINIST, October 10th, 1885. 2. What other papers can a machinist take besides the AMERICAN MACHINIST and the *Scientific American* from which he can obtain a knowledge of steam engineering? *A.*—There are a number of papers published in this country and in Europe, which treat on this subject. Choose those papers which will suit your purpose best, and in which subjects are presented in a manner and in a language which you can understand. The *Mechanical World*, of Manchester, England, is a good one.

(392) F. Y. F. asks: 1. What is the difference (if any) in the motion of the valve by suspending a link from a point above, or by supporting the same from a point below? *A.*—The valve will perform its function correctly, and in the same manner, in either case. 2. Why is a locomotive more powerful when in back gear? Generally, it is the result of faulty construction.

(393) W. A. P. writes: Please inform me to what part of a double-acting link marine engine the ram that balances the links in reversing is attached? *A.*—The ram may or may not be attached to the links. How and where to attach it depends upon the design of the engine.

(394) ——, Bath, Maine, writes: I have been building an engine of the following dimensions: Cylinder, 2 inches in diameter; stroke, 4½ inches; number of revolutions, 60 per minute; and steam pressure, 30 pounds per square inch. I say that the engine is about 1½ horse-power. Am I right or not? *A.*—You are wrong. About 1-10th of a horse-power will be nearer correct. The size of your steam ports will allow you to increase the number of revolutions per minute; by so doing the power will also be increased.

(395) T. C. J. writes: With ordinary tubular boilers is it better to cover the mud drums or leave them exposed to the full heat of the furnace? *A.*—It is best to cover the mud drums. 2. Would it be possible to heat a room by using an exhaust fan (running at say 500), and drawing the hot air from the inside of a jacket around the breach or smoke-pipe near the boiler, and would it pay? *A.*—It is possible to do so, but it would not pay. 3. Would it pay to use an exhaust fan to run fast, and pull the exhaust steam from a heater? *A.*—No. 4. Can a lifting injector throw water to a height of 100 feet, and what would be the value of such as compared to steam pump? *A.*—Lifting injectors are not made for the purpose of throwing the water so high, but with an ejector you can throw the water to a height of 100 feet. The value of such, when compared with a steam pump, depends on the conditions under which the ejector is to be used. 5. Is it possible for a good boiler-feeder steam pump to get the water too hot when the pump is flooded—that is, when the supply is above the cylinder? *A.*—No.

BUSINESS SPECIALS

Transient Advertisements 50 cents a line for each insertion under this head. About seven words make a line. Copy should be sent to reach us not later than Wednesday for the ensuing week's issue.

Shafting Straighteners. J. H. Wells, Tampa, Fla.

Patent Att'y, H. W. T. Jenner, Washington, D. C.

J. Clayton, Air Compressors, Rock Drills, 43 Dey st, N Y

Edw. Sears, Wood Engraver, 169 William st., N.Y.

Steel Name Stamps, etc. J. B. Roney, Lynn, Mass.

Solid Nickel-Seated "Pop" Safety Valves. Consolidated Safety Valve Co., 111 Liberty st., N. Y.

Selden Packing, for stuffing-box, with or without rubber core. Randolph Brandt, 38 Cortlandt st., NY

The Best Upright Hammers run by belt are made by W. P. Duncan & Co., Bellefonte, Pa.

Light articles built to order by the American Sewing Machine Co., Philadelphia, Pa.

R. Dudgeon, 24 Columbia st., New York, Improved Hydraulic Jacks and Roller Tube Expanders.

Davis Key-Seating Machines, kept in stock, by Manning, Maxwell & Moore, 111 Liberty st., N. Y.

Pattern and Brand Letters. Vanderburgh, Wells & Co., cor. Fulton and Dutch sts., New York.

20", 25," 28" B.G. and S. F. upright drills for immediate delivery. Currier & Snyder, Worcester, Mass.

The best wire nail and tack and nail machinery. Wm. A. Sweetser, Brockton, Mass.

Ice and Refrigerating Machines. 120 built, and all successful, by David Boyle, 521 Monroe, Chicago, Ill.

Inventions, Models, Gear-cutting and light mechanical work. A. P. Brown, 108 Liberty st., N. Y.

20,000 addresses of steam users and users of mach. in 10 States, $10. J. N. Mills Pub. Co., 30 Vesey st., N. Y.

"How to Keep Boilers Clean." A book mailed free, by James E. Hotchkiss, 93 John st., N. Y.

The Improved Tabor Steam Engine Indicator, made and sold by The Ashcroft Mfg. Co. 111 Liberty st., N. Y.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocum & Son's Shafting Works, Drinker st., Philadelphia, Pa.

Complete sets of Castings for making small and medium-sized Vertical Engines; send for prices. Humphrey's Foundry, Bellefontaine, O.

Engine Lathes, Hand Lathes, and other fine tools, Assortment large; prices low. Frasse & Co., 92 Park row, N. Y.

Machinists' supplies, brass goods m'f'rs supplies, polishing materials, all kinds wire, metals, etc; in any quantity. Jordan & Gottfried, 208 Canal st., N. Y.

Wanted—Good man in every shop in the South and West to sell Tools. Samples free, C. H. Besly & Co., 175 and 177 Lake st., Chicago, Ill.

St. John Improved Self-adjusting Cylinder Packing, for marine and stationary engines and locomotives; applicable to water, air, oil and ammonia pumps. For durability and minimum of friction, it is unexcelled. Send for pamphlet. Address, Balance Valve and Piston Packing Co., room 58, 280 Broadway, New York.

Patent Binders for the AMERICAN MACHINIST, holding a complete volume (52 issues), simple, neat, durable. Price $1, prepaid, to any part of the United States by mail. To Canada or foreign countries the price will be 75c.; purchasers pay express charges and customs duties. AM. MACHINIST PUB'G CO., 96 Fulton st., N. Y.

"Indicator Practice and Steam Engine Economy." By F. F. Hemenway. Contains plain directions for using the indicator, and making all required calculations from the diagram; also the principles of economy in operating steam engines, and current practice in testing engines and boilers. Price, $2 post-paid. Published by John Wiley & Sons, 15 Astor Place, New York.

MANUFACTURES

A. F. Barrett will erect brass works at Canton, O.

A company is being organized at Atlanta, Ga., to start a chair factory.

Doyle & Co., Americus, Ga., will erect a new furniture factory.

Geo. W. Snyder, Somerset, Pa., will erect a new wagon factory.

A. H. Osborne, of Clarksburg, W. Va., will erect new machine shops.

Isaac E. Smith will erect a factory on Twenty-first street, New York, to cost $14,000.

The Detroit (Mich.) Brass and Copper Company will build a $50,000 rolling mill.

J. Rapp, St. Louis, Mo., will build a $6,000 carriage factory at Twenty-second and Pine streets.

Halstead & Company will build a $10.000 pork packery at 200 Forsyth street, New York.

Chas. G. Emery will erect a $10,000 factory on Grand, corner East street, New York.

Fred. Hoech will build a $12.000 fur-dressing factory at 782 Flushing avenue, Brooklyn, N. Y.

W. A. Wattber will build a $16,500 factory at 11 Tiffany Place, Brooklyn, N. Y.

The September pay roll of the Pennsylvania Steel Company, Steelton, Pa., contained 3,396 names.

Doyle & Co., Huntington, W. Va., are erecting a machine shop, 42x23 feet, two stories high.

Williams & Briggs, Meridian, Miss., will enlarge their foundry and machine shop.

A new iron foundry is contemplated at Port Clinton, O. O. R. Clark is interested.

I. J. Dunn, of West Gardener, Mass., will erect a chair factory in Keene, N. H.

Stephens Bros. will put additional machinery in their saw mill at St. Francis, Ark.

The Knights of Labor propose to start a shop in Birmingham, Conn., to manufacture pocket knives.

Albert Lea, Minn., wants a woolen mill, and has raised a bonus to have one located in that town.

L. W. & J. H. Mann, lately reported as to start a machine shop at Ocala, Fla., will also establish a brass foundry.

The Gainesville Fertilizer Manufacturing Company, Gainsville, Fla., are erecting the fertilizer factory reported last week.

Donohue & Henneberry, of Chicago, will erect a six-story factory at 407 Dearborn street, to cost $125,000.

A new factory for the manufacture of reapers and mowers will be erected in Martinsburgh, Pa. Daniel Snobarger is interested.

It is rumored that the Sloss Furnace Company, Birmingham, Ala., contemplate establishing steel works.

A foundry and machine shop is to be erected by a company at West Plains, Mo. J. A. Peek is interested.

A. J. Boyce, of East Liverpool, O., is making extensive improvements to his foundry and machine works.

The Bristol Rolling Mill Company, of Bristol, Pa., will make extensive improvements to their works They will also build a machine shop.

The East New York Whip Manufacturing Company has leased a mill building at Babylon, N. Y., and will begin operations soon.

A stock company with a capital of $50,000 has been formed at South Pittsburgh, Tenn., to build pipe works. G. E. Downing will be manager.

D. C. Bacon, Savannah, Ga., contemplates erecting a planing mill at some point on the Georgia Central Railroad.

The Pennsylvania Railroad Company have bought 360 acres of land at Ocala, Fla., and will, it is stated, erect a veneering factory.

C. Hegewald & Co., of New Albany, Ind., are building a new boiler and sheet-iron works on Water street.

A new factory is being built at Mansfield, Mass., for the Frenier & Razee Electric Supply Company, of Manchester, N. H.

H. A. Briggs, New Orleans, La., is in Birmingham, Ala., prospecting with a view to establishing sheet-iron and machine works.

The Newton Cotton Mills, Newton, N. C., are greatly enlarging their buildings, and will put in considerable new machinery.

A new manufacturing establishment is to be started in Akron, O., whose specialty will be the manufacture of electric locomotive headlights.

The Atlanta Wagon and Timber Company, Atlanta, Ga., will enlarge their works as soon as a suitable location can be secured.

It is stated that an engine-house and a machine shop will be erected at Clifton Forge, Va., by the Richmond and Allegheny Railroad Company.

Thomas Young is preparing to start a stove foundry at Alexandria, Va. He has purchased a site.—*Baltimore Manufacturers' Record.*

The Clinton Wire Cloth Company, Clinton, Mass., are about to make extensive additions. One of the mills has been running nights for two years.

The Columbia Iron Company's mill at Columbia, Pa., is being enlarged. It started new but a few months ago.

The Carlisle Iron Works at Boiling Springs, Cumberland County, Pa., have been sold at sheriff's sale to J. G. Bucher for $40,000.

The old Bath Springs property at Bristol, Pa., once a noted summer resort, is to be turned into a carpet factory.

Messrs. Miller, Metcalf & Parkin (Crescent Steel Works), Pittsburgh, have perfected arrangements for the manufacture of self-hardening steel.

A company will be formed at Atlanta, Ga., by Frank A. Smith, of Steelton, Pa., and others, to manufacture his ice machinery. The capital stock will probably be $100,000.

Charles Ogle, Baltimore, has received the contract to build the depot, engine house and machine shop at Annapolis, Md., for the Baltimore Short Line Railroad Company.

At Mansfield, Mass., ground has been broken for the new building to be occupied by the Frenier & Razee Electric Supply Company, who will remove their works from Exeter, N. H., on its completion.

The Youngstown, O., capitalists who purchased the rolling mill in Hubbard have decided to almost entirely remodel it, and will turn out only hoop and band iron, adding a sheet-mill later.

A factory for the production of machinery and edge tools, principally the latter, will be opened in St. Louis in the course of a few weeks. A new process of manufacture will be employed.

The Brush Electric Illuminating Company—Wm. L. Strong, president—will erect a four-story building for electric light machinery at 208 Elizabeth street, New York. It is to cost $40,000.

The principal car shops of the Wisconsin Central road will remain at Stevens Point, Wis., and the locomotive repair shops will be established at Waukesha.

The Nathaniel Weston Lumber Company—capital stock, $75,000—has been incorporated in Arkansas by Nathaniel, William, Rowland and Sarah F Weston. They will erect a mill near Humphrey.

The Texarkana Foundry and Machinery Company—capital stock, $20,000—has been chartered at Texarkana, Tex., by F. F. Estus, W. A. Kelsey, L. A. Pattillo and W. H. Pattillo.

The Shellenberger Nut and Lock Company—capital stock, $100,000—has been incorporated at Dallas, Tex., to manufacture nuts and locks, with S. L Shellenburg, J. T. Miller, Geo. Noble, A. L. Smith and Benton Quick as directors.

The jewelry business at Attleboro, Mass, is reported to be flourishing, and only two out of the thirty-five or forty shops are running on short time, and these shops are working eight and nine hours daily.

A company has been organized, with a capital stock of $175,000, to erect a charcoal furnace at Decatur, Ala. Work will be commenced as soon as a site is donated. H. M. Pierce, Calera, is president.

The Phœnix Iron Works, of Meadville, Pa., recently shipped to Bangkok, Siam, an engine and boiler, to duplicate an order of about eight months ago. The machinery will be taken inland by canoe 200 miles.

Mr. N. W. Howson, who has for seventeen years been master of machinery of the Cumberland and Pennsylvania Railroad, has resigned that position to accept the superintendency of the Eames Vacuum Brake Company at Watertown, N. Y.

The Chicago Wire Nail Company, lately incorporated with a capital stock of $200,000, will soon erect extensive works. The incorporators are the following: C. F. Collot, Louis A. Fontaine and John J. Knickerbocker.

Mr. W. E. Curry, of Columbus, Ga., is erecting a wood-working establishment. Will make light fancy articles — brackets, turnings, mouldings, scroll sawings of all descriptions, etc. Will purchase motor and some machinery.

Trevor & Co., Lockport, N. Y., issue a neat illustrated catalogue of their handle machinery. It is "Catalogue B," and is dated September, 1886. In it are represented machines for turning handles of various kinds, and preparing the stock from the log. The machines are well described.

The East Mississippi Machine and Foundry Works—capital stock, $50,000—has been incorporated at Meridian, Miss., by S. S. Williams, D. D. Briggs, J. S. Solomon, C. W. Robinson and others, to enlarge and operate the foundry and machine shop of Williams & Briggs.

Wm. Wharton, Jr., & Co., 330 Market street, Philadelphia, have issued a handsome catalogue, containing illustrations of White's patent gyrating hoist, shown in our issue of August 14th, 1886. The book also illustrates very fully in detail the parts of which the hoist is composed, while also illustrating a number of other hoists, overhead railway apparatus, safety switches, and similar specialties.

Business is very slack at the brass works at Haydenville, Mass., and 80 men were discharged Saturday, while the remainder will work nine hours five days in a week and eight hours Saturday. Until within a few months the concern has had all the work the men could do, but for a while the shops have been run but five days a week. Most of the discharged hands will look for work elsewhere.—*Boston Commercial Bulletin.*

Merwin McKaig, Cumberland, Md., most of whose specialties have been illustrated in our columns, writes us: "I am very busy, running day and night, shipping large lots of shafting, pulleys, etc., all over the country. Shipped a lot a short time ago to Cuba. The Hartman Steel Works, of Beaver Falls, have just placed their order with me for one of Muncaster's shafting straighteners."

"He wants to give us an order for some mill machinery," said a member of a local firm of machinists and founders the other day, after he had turned away from a Western gentleman with whom he had been talking, "and we don't want it. The fact is, we are already too busy to think. If he had offered us the order a few months ago, we would have been glad to have got it." We repeat the conversation as a significant "straw."—*American Manufacturer, Pittsburgh.*

Mr. Wm. Fuller, who was so many years master mechanic of the Atlantic and Great Western Railway, has been appointed mechanical superintendent of the Colorado Midland, with headquarters at Colorado Springs, Colo. He will have charge of the construction of the company's shops and stations, and will at once proceed to the scene of operations. Mr. Fuller enjoys a most excellent reputation as a mechanic, railway man and gentleman.—*Railway Age.*

McConway & Torley, manufacturers of railroad supplies, Pittsburgh, Pa., are erecting extensive new works. The building is an immense structure extending from Forty-eighth to Forty-ninth streets, and from the A. V. R.R. tracks to the river. It will be composed entirely of brick, and will be much larger and more complete than the present works of the company on Twenty-seventh street. The machinery, it is thought, will be in place in time to start the mill in operation by the first of next year.

Henry Disston & Sons, of Philadelphia, the greatest saw-making firm in the United States, if not in the world, have decided to move the steel-melting department of their works to this city. The step has been taken for two reasons—one, the strike of the melters, and the other the advantages afforded by natural gas. Different sites have been examined, but we understand that the site most thought of—if, indeed, it has not been selected—is one on the Monongahela, above the city, and between the tracks of the Baltimore and Ohio and the Pennsylvania railroads. The works will give employment to several hundred men.—*American Manufacturer, Pittsburgh.*

Messrs. Wm. H. Everson & Co., of the Scottdale Iron Works, Scottdale, Pa., will have completed in about six weeks their new rolling mill, consisting of two trains of sheet rolls, one train for making heavy gauges and one train for making light gauges of sheet iron and steel, and one complete 18-inch skelp-iron train, for skelp iron from twelve to twenty inches wide, the whole to be driven by a heavy engine, forty-inch cylinder, sixty-inch stroke, with forty-ton fly-wheel. The engine was built by the Pusey & Jones Company, of Wilmington, Del., and the roll trains by Totten & Co., of Pittsburgh. This mill is being built with numerous improvements, and is expected, when completed, to be one of the best-bu lt rolling mills in the State.

The Dueber Watch-Case Manufacturing Company, Newport, Ky., and the Hampden Watch Works, controlled by Mr. Dueber, will soon have a large new manufacturing plant at Canton, O. The Canton *Repository* says: "The new works are to be situated on a plot of twenty acres lying just outside the city limits of Canton, but closely contiguous to the business part of town. To this tract Mr. Dueber has added by purchase five acres more, which he will beautify with lakes, drives, walks, etc. To compensate him for the large loss by reason of shrinkage in business during removal, cost of transportation, etc., the citizens of Canton raised the sum of $100,000. They have also furnished him with ample switching conveniences. The structures as designed are rich in architectural finish, without being too ornate, and are imposing in every detail. They represent a series of large oblong central buildings, with two long, narrow wings extending out on either side of each, the whole relieved by graceful bays, circular towers, airy minarets and rounded ends. The general effect is that of immense exposition buildings, rather than ordinary shops; and this effect is heightened by the great expanse of windows, light being a prime necessity. Work has already begun on the building, which will be occupied by the Hampden Watch Works; contracts for the still larger building (watch-case works) will be let Jan. 12 The first building (watch works) will be 575 feet long and 270 feet deep from front of central portion to rear of engine-house. The watch-case works will be a duplicate of this, only 55 feet longer, or 630 feet long. The central portion will be 80x170 and five stories high. The series of wings will each be 250 feet long, and three stories high, with nearly a full story on top of that. They are only 25 feet wide in the Hampden works and 30 feet in the Dueber works—the better to insure light. All the roofs are to be of monitor section. The engine-houses will each be 66x67, and will contain six boilers each. The stacks will be 150 feet high, and 16 feet in diameter at the base. The base will be octagonal in form, with 22 feet of stone-work; the stacks proper will be round. We are not informed as to the capacity of the new works, but the present works at Newport are turning out over 200,000 watch-cases this year, and are crowded up to their fullest capacity."

Machinists' Supplies and Iron.

NEW YORK, Oct. 29, 1886.

Iron—The market for pig is very firm, but prices have not changed. Most of the furnaces in blast are sold up to their full capacity, and choice brands cannot always be had for prompt delivery. The available offerings, however, of good brands of foundry iron are sufficient for current requirements, and there is not much disposition on the part of either manufacturers or consumers to make any large contracts in advance. Grey Forge is in extra good demand. We quote No. 1 X Foundry, $18.50 to $19.50; No 2 X Foundry, $17 to $17.50; and Grey Forge, $16 to $16.50. Scotch pig continues firm at the recent advance, and advices from Glasgow tend to strengthen the market. We quote Coltness,$ 21.50 to $22; Glengarnock, $19.50 to $20; Gartscherrie, $20.00 to $21; Eglinton, $19 to $19.50; and Lanlogan, $21.

The rail market is firm, at $34 to $34.50 for next year's delivery, and $35 to $35.50 for this year's delivery.

Lead—There has been a dull and weak market in common pig. We quote Western at about 4 cents, in car-load lots; and foreign, 4⅜c.

Tin—A slight advance has been made in London, but it has had but little effect on the market here. Banca sells at 23c.; Straits and Malacca, 22.60c., prompt cash, and 22.70c., thirty days; Australian, 22⅝c, cash, and 22.70c., thirty days; and L. & F. 23c.

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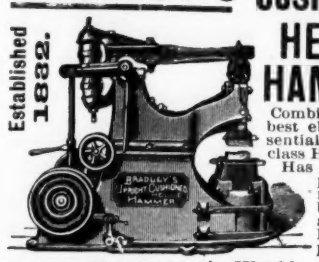

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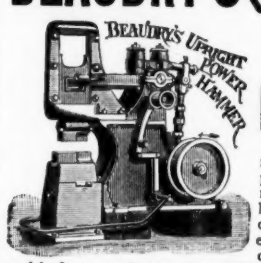

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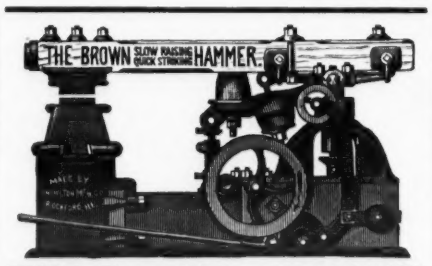

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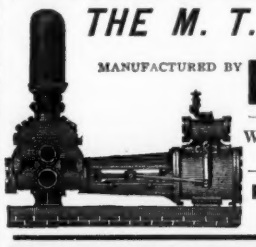

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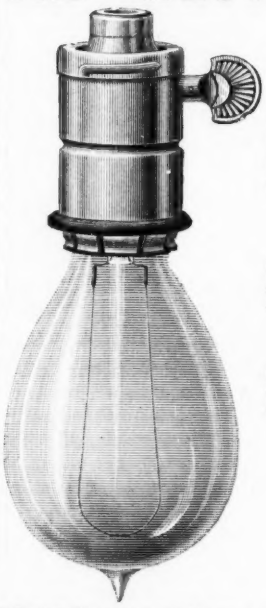

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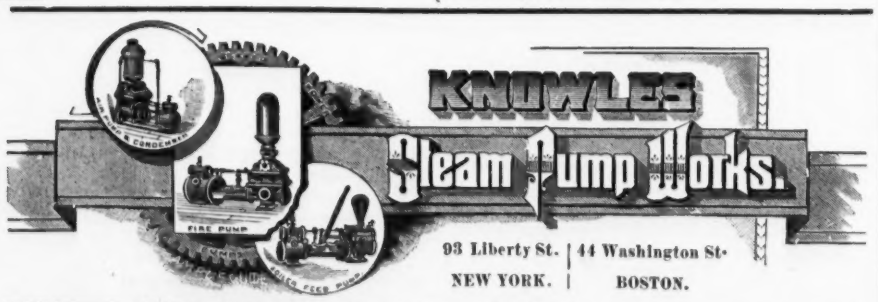

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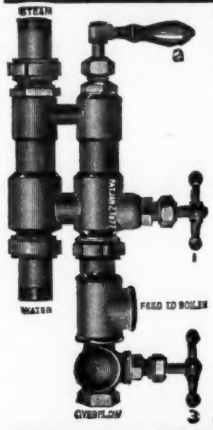

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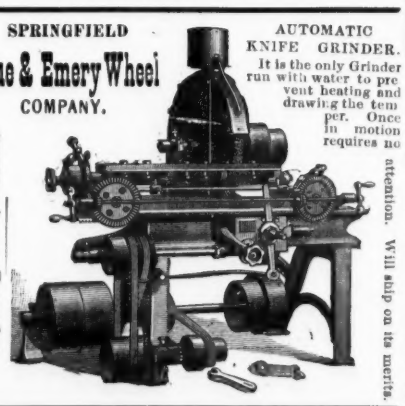

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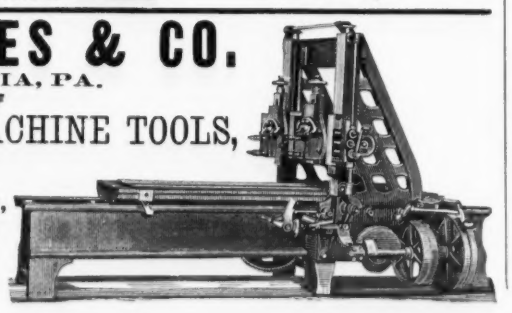

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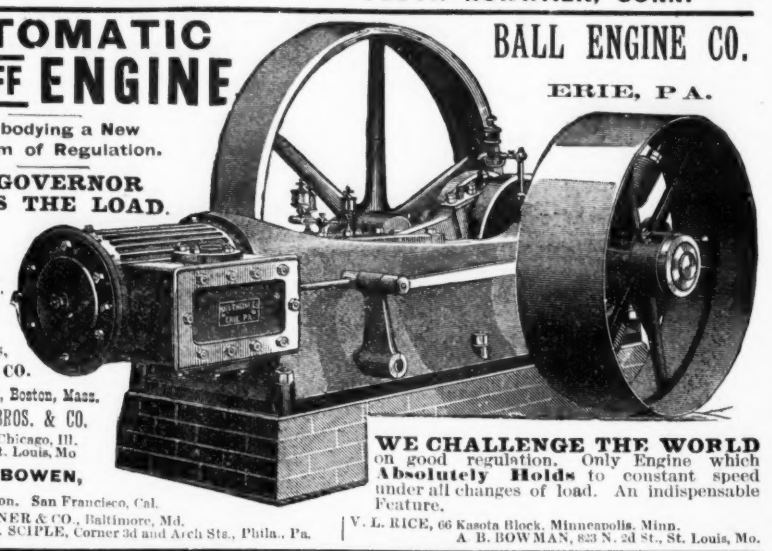

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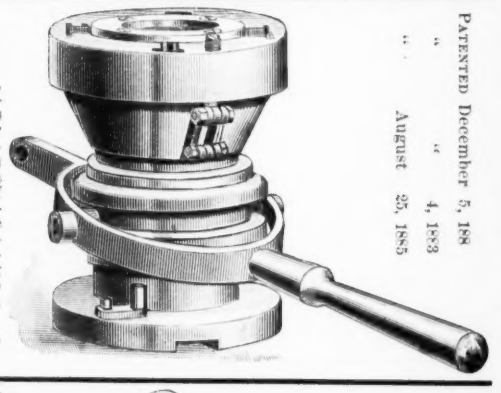

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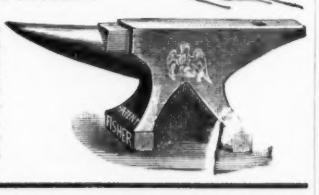

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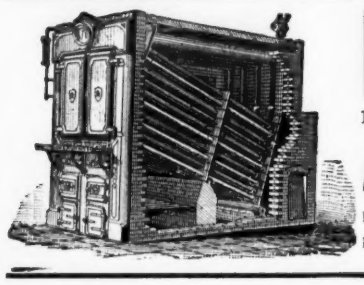

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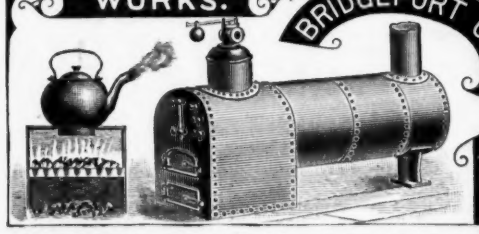

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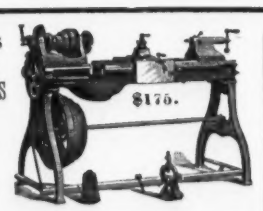

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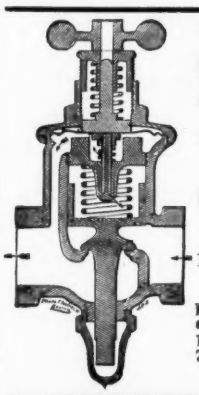

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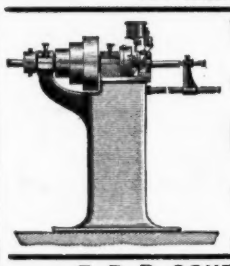

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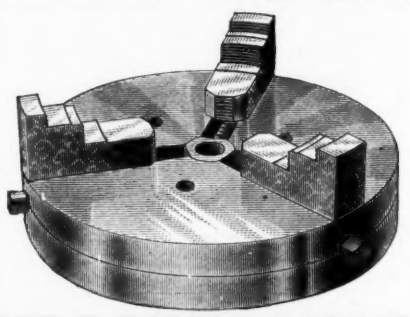

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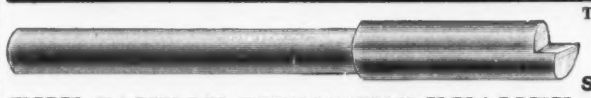

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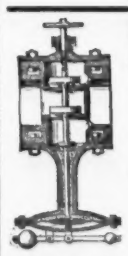

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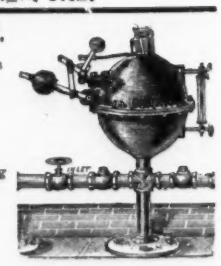

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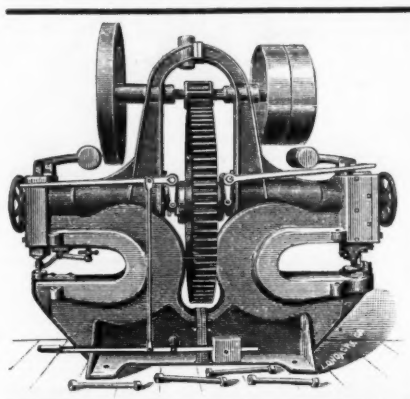

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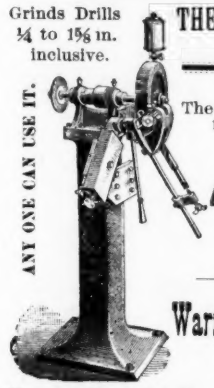

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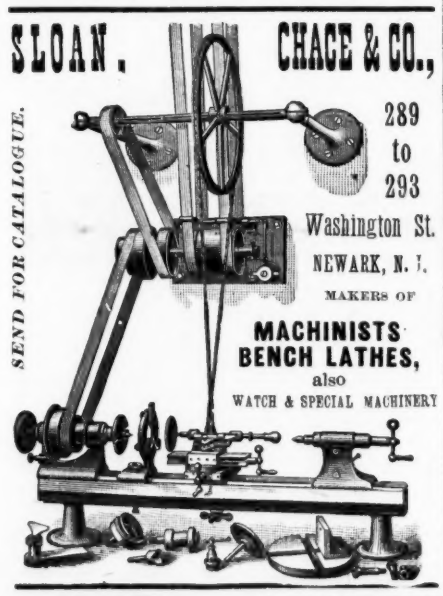

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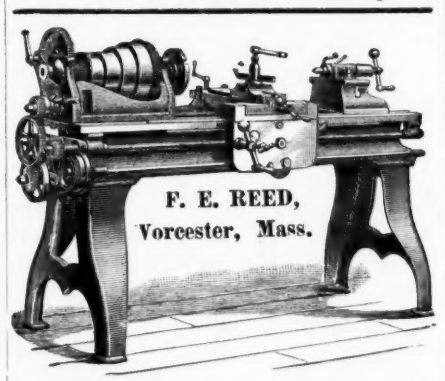

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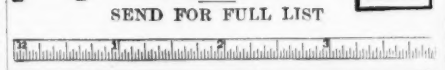

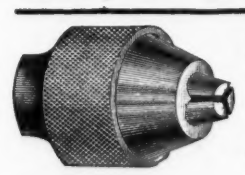

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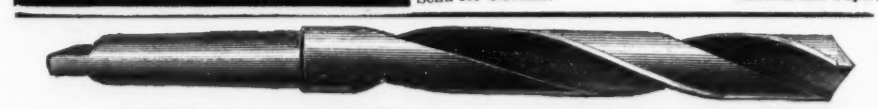

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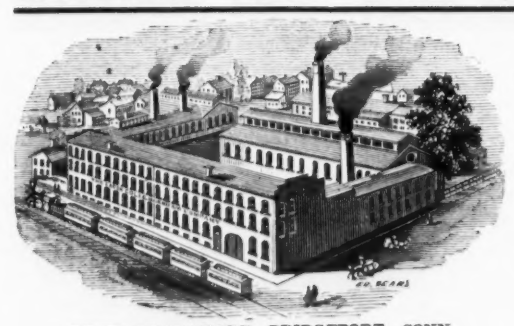

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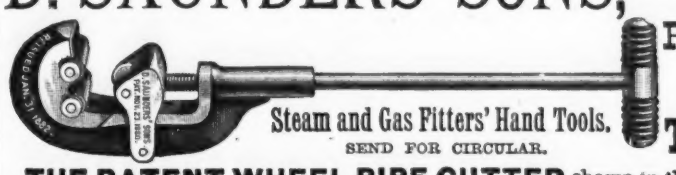

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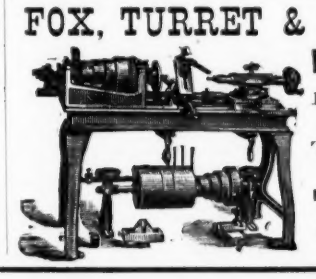

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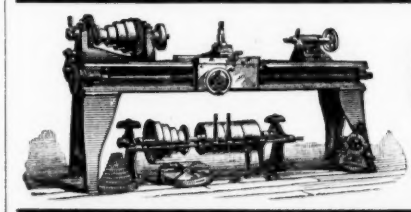

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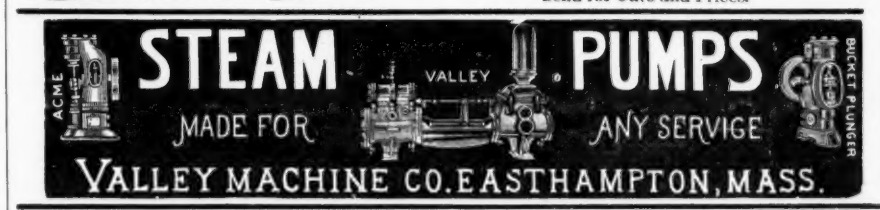

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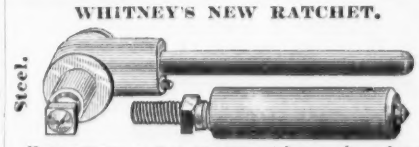

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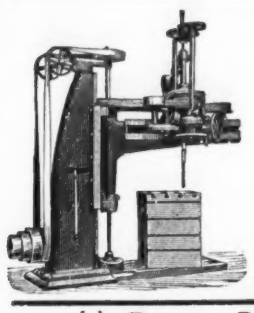

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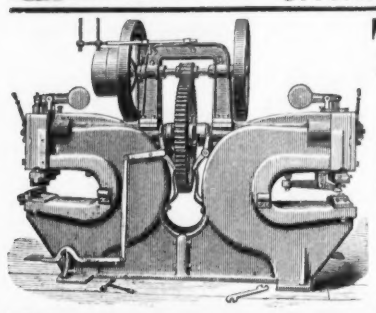

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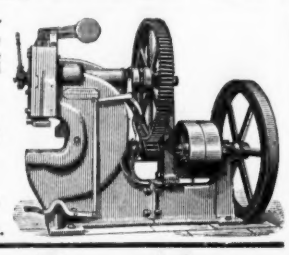

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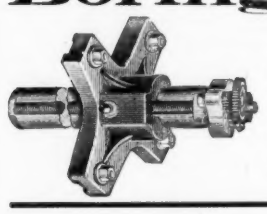

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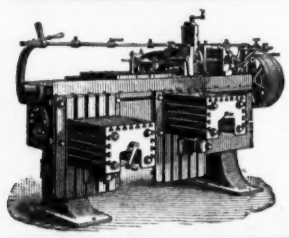

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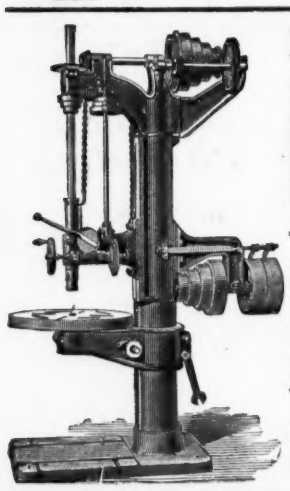

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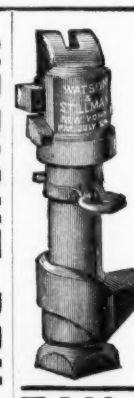

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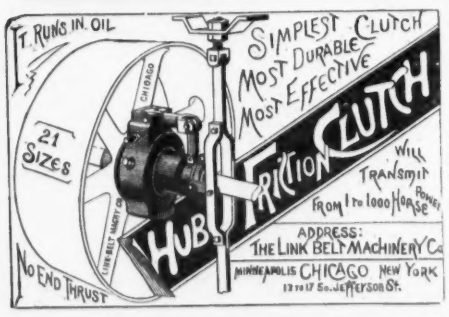

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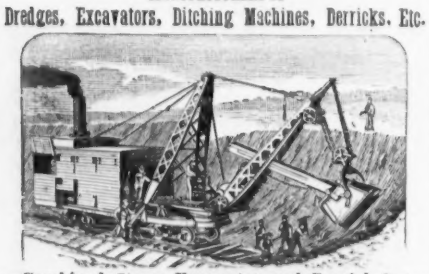

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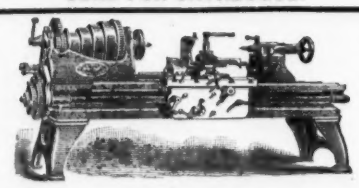

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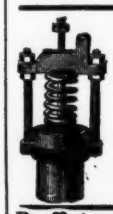

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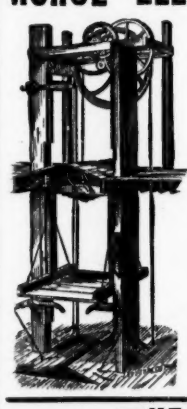

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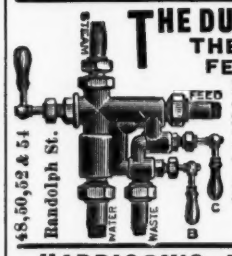

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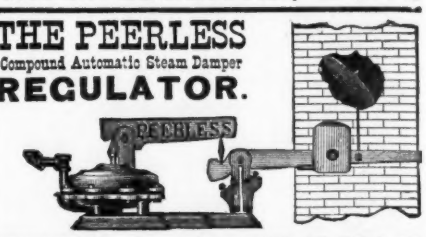

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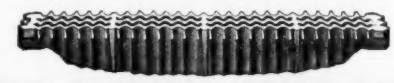

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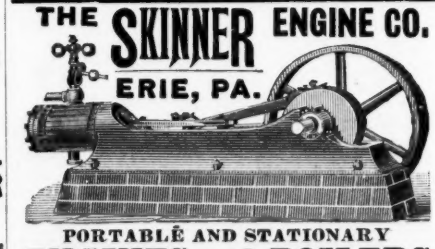

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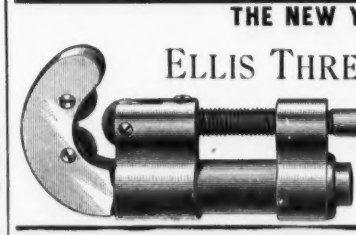

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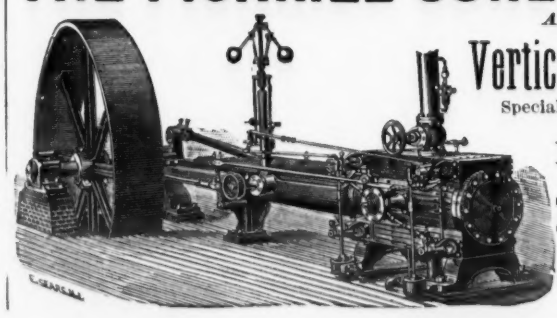

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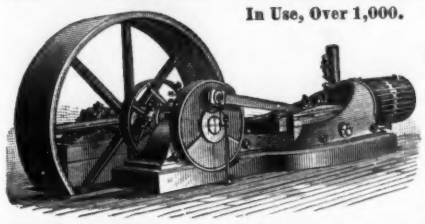

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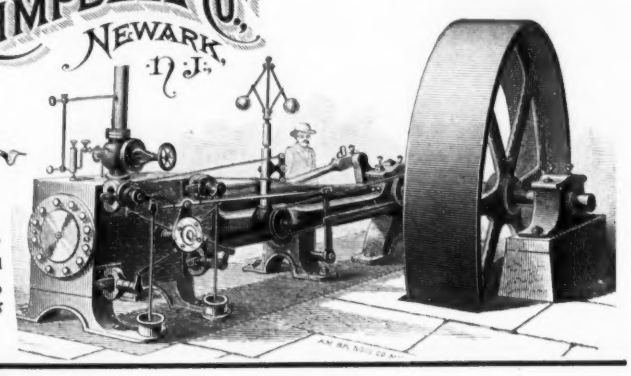

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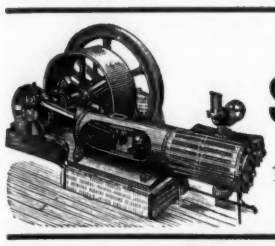

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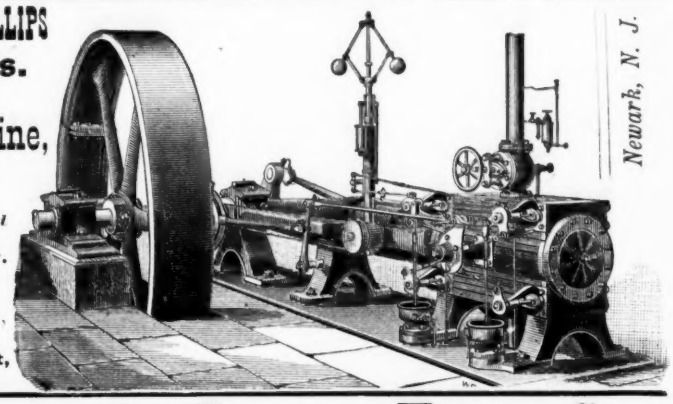

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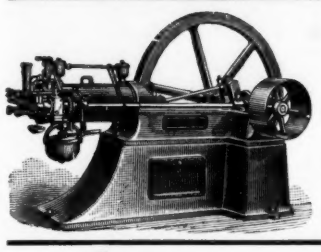

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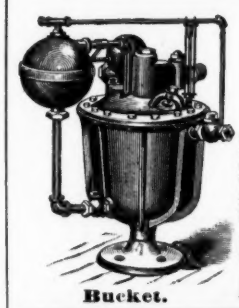

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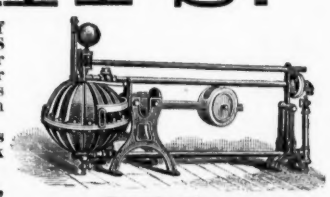

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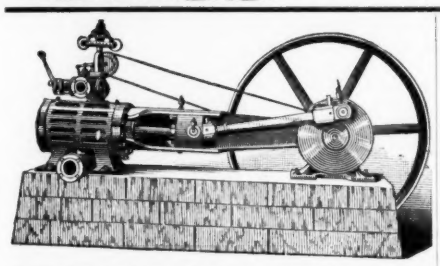

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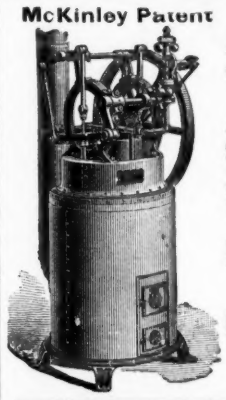

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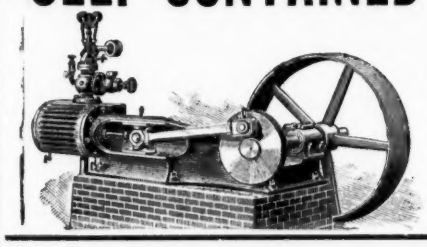

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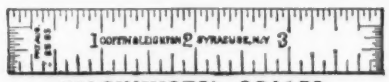

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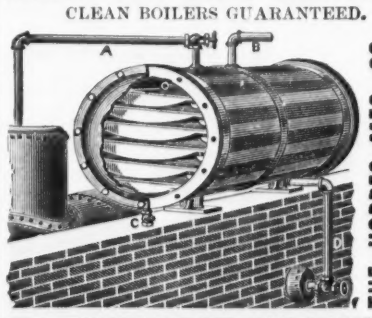

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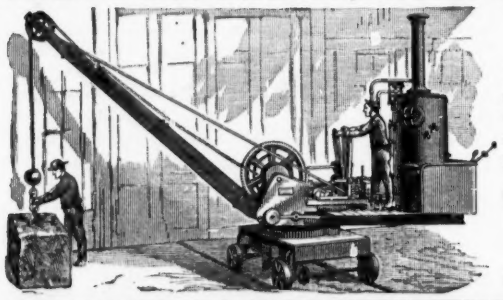

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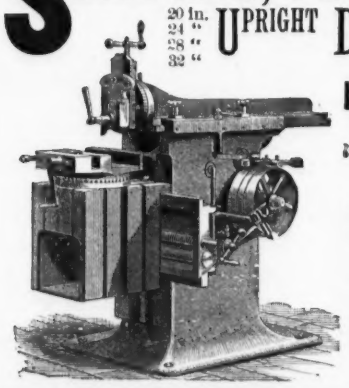

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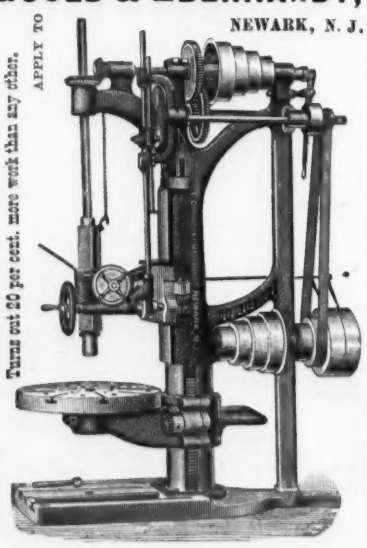

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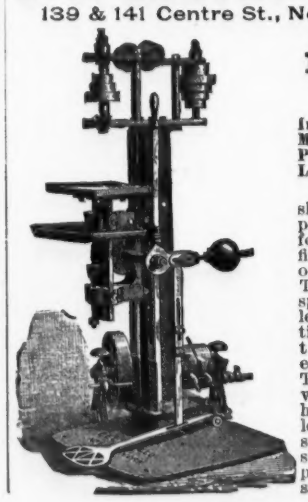

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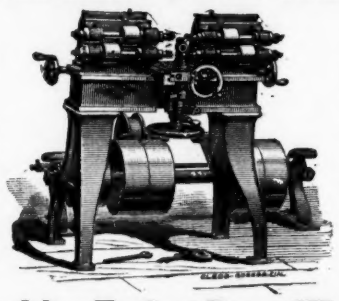

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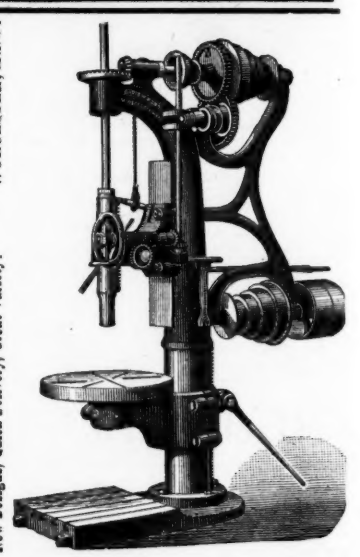

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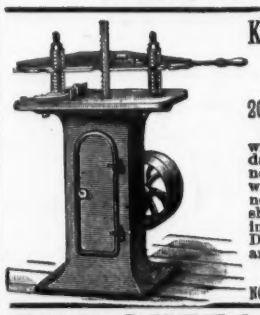

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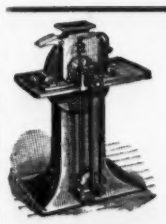

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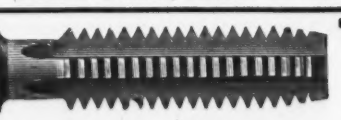

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